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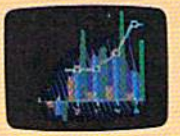

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RUNNING RUMINATIONS

CELEBRITY SOFTWARE

Celluloid heroes will soon become silicon heroes.

This was the big story at the Consumer Electronics Show in Chicago, where the computer industry showcased a new image. Strutting its stuff with all the aplomb of Indiana Jones or James Bond, the industry has "gone Hollywood." And nowhere is this more evident than in entertainment software, which, statistics tell us, is the fastest-growing segment of software development.

Licensing stars and shows with a frequency that would make any name-dropping, tinsel-town gossip columnist blush, software companies are seeking an edge—trying to capitalize on who's hot or has nostalgic value.

The computer software industry is working on a new, "cool" image.

With all the choices you'll be faced with later this year, it's difficult to know which software is for you. So, here's a guide to some of the stars that will soon be appearing on a computer near you.

Several software companies are signing professional athletes to endorse their products. John Elway's favorite game is called, appropriately enough, John Elway's Quarterback, from Melbourne House. And Pete Rose lends his ball-playing acumen to the development of a baseball game by Gamestar—Pete Rose Pennant Fever.

If you can't find a big-name athlete, try a big-name author. It helps if his work has appeared on the *New York Times* best-seller list. Tom Clancy, for instance, has two programs out on the market right now—The Hunt for Red October and Red Storm Rising, based on his highly acclaimed novels.

How about a box-office best-seller? Willow and Platoon are two such offerings that are currently hot. Data East's Platoon is based on the award-winning movie of the same name. Willow is an adventure-fantasy computer game based on the story by George Lucas.

You will also soon be able to assume the role of Arnold Schwarzenegger in the movie-turned-computer-software, Predator. Another adventure taken from the wide screen and adapted for the computer screen is Star Wars from Broderbund.

Turning to the cartoon world, you'll see such characters as Larry, Moe and Curly on Cinemaware's Three Stooges and Wile E. Coyote and the Road Runner on Mindscape's Road Runner.

How about Ralph, Norton, Alice and Trixie? They can be seen on The Honeymooners from First Row Software, which is also releasing The Twilight Zone.

Look for Hanna-Barbera cartoon characters—The Flintstones, The Jetsons, Scooby-Doo and Johnny Quest—to appear soon on your computer screen, courtesy of software from MicroIllusions.

Of course, having a big name doesn't guarantee a successful product, and there are many high-quality programs that lack this gimmick. But it's an interesting trend, and developers hope they will be successful in cashing in on the popularity and glamour associated with Hollywood.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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C64C

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Circle 98 on Reader Service card.

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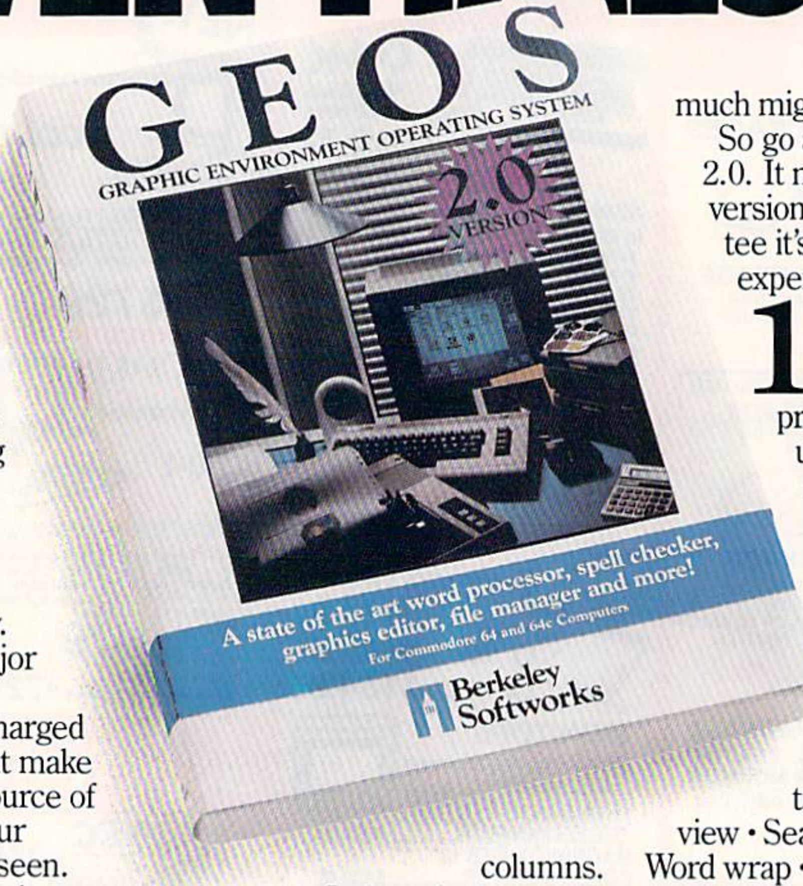
SEVEN TIMES BET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A state of the art word processor, spell checker, graphics editor, file manager and more!
For Commodore 64 and 64c Computers
Berkeley Softworks

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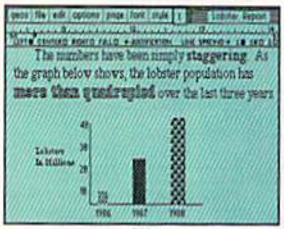
Not the kind that sends a small surge through your creativity. We're talking about major productivity power.

GEOS 2.0 is supercharged with new strengths that make it the most powerful source of integrated software your Commodore 64's ever seen. And what isn't completely new has been radically improved. In fact, we actually included other applications—products we used to sell separately—right into this package.

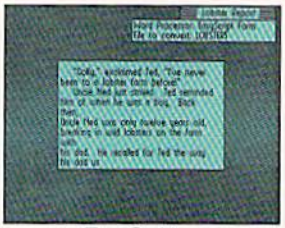
For example, the entire contents of geoWrite Workshop, including geoWrite 2.1™ (the full-featured word processor) have been added along with geoSpell.™ And a new feature lets you mix graphics with text around any number of columns.

It doesn't even matter if the text is from some other Commodore-based program. Because GEOS 2.0 converts it with one simple point and click.

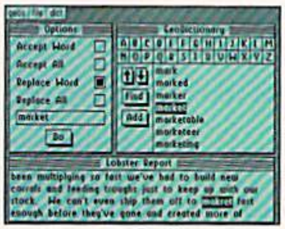

geos
file
edit
options
page
font
style
Lobster Report
Lobsters In Millions
1986
1987
1988

The numbers have been simply **staggering**. As the graph below shows, the lobster population has **more than quadrupled** over the last three years

geoWrite


Lobster Report

Text Grabber


geos
file
dict
Options
Accept Word
Accept All
Replace Word
Replace All
market
Do
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A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
Find
Add
mark
marked
marker
market
marketable
marketeer
marketing
Lobster Report

been multiplying so fast we've had to build new corrals and feeding troughs just to keep up with our stock. We can't even ship them off to market fast enough before they've gone and created more of

geoSpell

There's a new deskTop.™ A new painting toolbox. And new muscle that makes your mouse much mightier, for starters.

So go ahead. Try GEOS 2.0. It may be our second version, but we guarantee it's seven times the experience.

1. geoWrite 2.1: NEW! Full-featured word processor • Individual paragraph formatting • Expand margins to 8″ • Left, right, center and full justification • Multiple vertical spacing options • Headers and footers • Decimal tabs • Full page preview • Search and replace • Word wrap • 10 fonts in 7 styles and multiple sizes • Pagination • Insert, delete, move or copy • Mix text and graphics • Special feature to create multiple columns, add headlines and borders • Produce near-typeset quality output on an Apple® LaserWriter™ with PostScript.™

2. Text Grabber:™ NEW! Import text from any Commodore word processor such as

SOMETHING
TTER THAN GEOS.

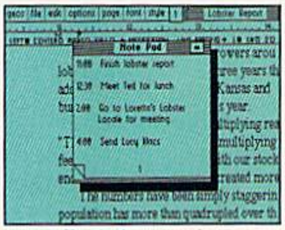
PaperClip,™ Easy Script,™ Speed Script,™ Word Writer™ and others.

3. geoMerge:™ NEW! Create customized form letters and labels with this mail merge program.

4. geoSpell: NEW! Complete spelling resource. View dictionaries and documents while spell checking • Create and update personal dictionaries • Global search and replace • Operates 38% faster than before.

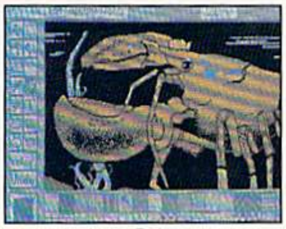
5. Desk Accessories: Five handy utilities accessible from within any application • 4 function calculator • 127 page notepad • Chiming alarm clock • Preference manager • Photo/text managers to save and transfer data between applications • NEW! Cut and paste from the calculator and notepad into other applications • Name photo album pictures • And more.

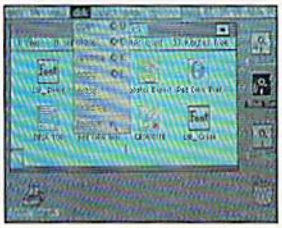
6. geoPaint:™ High resolution graphics editor. Create charts, diagrams or images up to 8″ × 10″ • Zoom in for detailed pixel editing or preview entire page • 16 colors, 14 graphic tools, 32 brush shapes and 32 painting patterns • Invert, rotate, mirror or move images • Cut, copy and paste into other GEOS applications • Integrate text with graphics • NEW! Stretch and scale images • Overlay effects • Stop pattern fills in progress • New graphic shapes including connected lines, ellipses and squares • Grid function for easy sketching.

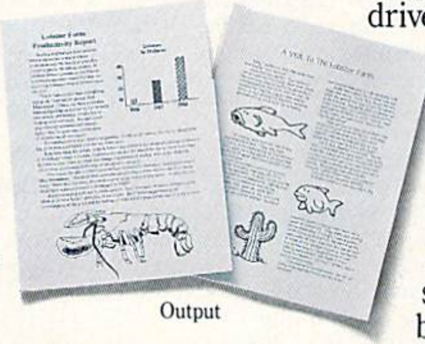


1:00 Finish lobster report
12:30 Meet Ted for lunch
2:00 Go to Loretta's Lobster Lodge for meeting
4:00 Send Lucy files

Desk Accessories


geoPaint


deskTop


Output

7. deskTop: Efficient file and disk manager • View files as icons or text • Sort files by size, type, date or name • Open, close, rearrange, copy or delete files • Manage non-GEOS files • Access and execute BASIC programs • NEW! Support for 2 drives and a RAM Expansion Unit (including the 1541, 1571, 1581 and RAM drives) • Multiple file selection • Color code notepad and files • Date and time display • Recover most recently deleted file • Faster file copying • Simplified printer and input driver selection.

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Circle 134 on Reader Service card.

MAGIC

Create your own character sets; give your C-64 no-scroll ability; use a 40/80-column toggle on your C-128.

Compiled by TIM WALSH

$4B7 64 MAZE CRAZE

Anyone who likes computer maze games will have hours of fun with 64 Money Monger. All the mazes are different, since they're randomly generated each time you play. You begin with 25 pieces of gold. Use the cursor keys to work your way through a maze, collecting gold pieces as you go. If you reach a dead end, you cannot retrace or backtrack. You can, however, press the space bar to blast your way through, but each blast will cost you three gold pieces. If you ►

TRICK OF THE MONTH

$4B8 MINI FONT EDITOR

Mini Font Editor provides four new SYS commands to use in creating your own character sets on the C-64. The fonts you can create are limited only by your imagination. You can also append Mini Font Editor to longer programs at the beginning of the listing.

The first two new SYS commands are different ways of creating characters. SYS DESIGN, screen code #, X1,X2, X3,X4,X5,X6,X7,X8, redefines the character specified by the screen code number. The eight variables (X1–X8) have values ranging from 0 to 255. For example, SYS DESIGN,1,255,0,255,0,255,0,255,0 redefines the letter A into a pattern of vertical lines.

The other method of creating characters is with SYS DRAW, screen code, which lets you draw a redefined character followed by eight lines consisting of a REM statement, an exclamation point, a quotation mark and any combination of eight spaces and asterisks followed by another quotation mark. Look at this example of how to redefine the letter A into a box.

```
300 SYS DRAW,1
310 REM !"********"
320 REM !"**    **"
330 REM !"**    **"
340 REM !"**    **"
350 REM !"**    **"
360 REM !"**    **"
370 REM !"**    **"
380 REM !"********"
```

The remaining commands are SYS COPY, for copying character sets, and SYS PLOT,X,Y, which positions the cursor anywhere on the screen. X is a value from 0–39 and Y is a value from 0–24.

```
0 REM C-64 MINI FONT EDITOR - RICHARD PENN
                                  :REM*168
10 FORT=49152 TO 49481:READD:POKET,D:CK=CK
   +D:NEXT                         :REM*84
20 IF CK<>48480 THENPRINT"ERROR IN DATA ST
   ATEMENTS":END                  :REM*180
30 COPY=49152:DESIGN=49201:DRAW=49230:PLOT
   =49454                         :REM*105
40 DATA 120,169,51,133,1,169,0,133,251,133
   ,253,169,223,133,252,169,63     :REM*24
50 DATA 133,254,160,0,177,251,145,253,136,
   208,249,198,252,198,254,165    :REM*114
60 DATA 252,201,207,208,237,169,55,133,1,2
   4,169,29,141,24,208,96,32,220  :REM*147
70 DATA 192,160,8,152,72,160,0,32,241,183,
   138,145,251,230,251,166,251     :REM*42
80 DATA 208,2,230,252,104,168,136,208,233,
   96,32,220,192,165,122,133,253   :REM*16
90 DATA 165,123,133,254,32,211,192,32,211,
   192,32,211,192,32,211,192,32   :REM*131
100 DATA 211,192,169,8,141,80,195,160,0,17
    7,253,201,143,208,88,32,211   :REM*131
110 DATA 192,177,253,240,81,201,33,208,245
    ,32,211,192,32,211,192,162,8  :REM*173
120 DATA 177,253,201,42,208,10,189,37,193,
    17,251,145,251,76,162,192,169  :REM*17
130 DATA 255,56,253,37,193,49,251,145,251,
    32,211,192,202,208,224,230,251 :REM*88
140 DATA 165,251,208,2,230,252,32,211,192,
    32,211,192,32,211,192,32,211  :REM*102
150 DATA 192,32,211,192,32,211,192,206,80,
    195,173,80,195,240,8,76,111   :REM*192
160 DATA 192,162,11,76,139,227,96,230,253,
    165,253,208,2,230,254,96,32   :REM*136
170 DATA 241,183,134,251,142,82,195,169,0,
    133,252,141,83,195,162,7,24   :REM*162
180 DATA 165,251,109,82,195,133,251,165,25
    2,109,83,195,133,252,202,208  :REM*202
190 DATA 238,169,0,141,82,195,173,24,208,2
    01,31,240,5,169,48,76,18,193  :REM*250
200 DATA 169,56,141,83,195,24,165,251,109,
    82,195,133,251,165,252,109,83  :REM*80
210 DATA 195,133,252,96,175,1,2,4,8,16,32,
    64,128,32,241,183,224,40,176   :REM*15
220 DATA 16,134,2,32,241,183,224,25,176,7,
    164,2,24,32,240,255,96,162,14  :REM*86
230 DATA 76,139,227                :REM*92
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

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Comparison of	Minimodem-C™ vs.	1670® vs.	Avatex
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DTR Signal Support?	Yes	No	Yes
High Speed Detect Line?	Yes	No	No
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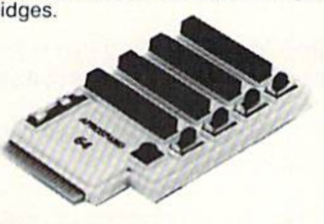

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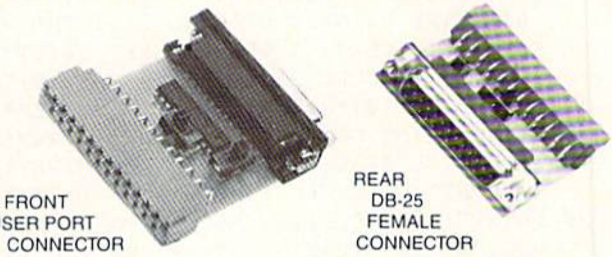

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```
0 REM 64 MONEY MONGER - NICKEY MACDONALD
                                    :REM*115
10 PRINT"{SHFT CLR}{CTRL 2}{CTRL 9}GOOD LU
   CK!":POKE53280,0:POKE53281,0:X=RND(-TI)
                                     :REM*78
20 MC=3:IM=25:MN=IM:X1=20:Y1=1:MV=1:WD=40:
   LN=24:SC=1024:CO=55296           :REM*231
30 GOSUB180                         :REM*119
40 POKECO+Y1*WD+X1,2:POKESC+Y1*WD+X1,174
                                      :REM*8
50 GETA$:IFA$=""THEN50               :REM*13
60 IFA$="{CRSR DN}"THENDY=1:DX=0    :REM*144
70 IFA$="{CRSR UP}"THENDY=-1:DX=0 :REM*222
80 IFA$="{CRSR RT}"THENDX=1:DY=0     :REM*48
90 IFA$="{CRSR LF}"THENDX=-1:DY=0 :REM*188
100 IFA$=" "ANDMN=>MCTHENMN=MN-MC:POKESC+(
    Y1+DY)*WD+X1+DX,32:GOSUB210     :REM*192
110 IFA$="Q"THENMN=MN-IM:MN=-MN*(MN>-1):GO
    TO220                           :REM*227
120 X=PEEK(SC+WD*(Y1+DY)+X1+DX):IFX=42THEN
    MN=MN+1:GOSUB210:GOTO140        :REM*142
130 IFX<>32THEN50                   :REM*190
140 X1=DX+X1:Y1=Y1+DY:MV=MV+1:IFY1<1THENY1
    =Y1-DY                          :REM*136
150 IFX1<0ORX1>WD-2THENX1=X1-DX     :REM*174
160 IFY1<LN-4THEN40                 :REM*200
170 Y=Y-LN+6:Y1=Y1-LN+7:GOTO30        :REM*2
180 Y=Y+1:IFY=LNTHEN210              :REM*81
190 FORZ=1TOWD-1:PRINTMID$("{CTRL 2} {CTRL
     8}*{CTRL 2}{SHFT N}{CTRL 2} {CTRL 2}{
    SHFT M}{CTRL 2} {CTRL 2}{SHFT N}{CTRL
    2}{SHFT M}{CTRL 2} {CTRL 2}{SHFT V}",I
    NT(RND(1)*10)*2+1,2);            :REM*75
200 :NEXT:PRINT:GOTO180              :REM*57
210 PRINT"{15 SPACEs}{15 CRSR LFs}MONEY:"M
    N:PRINT"{CRSR UP}";:RETURN       :REM*36
220 PRINT"{SHFT CLR}YOU MADE $"MN"IN"MV"MO
    VES,":PRINT"THAT'S"INT(MN*100*(MC-1)/M
    V)"%"                             :REM*6
```

—NICKEY MACDONALD, FREDERICTON, N.B., CANADA

$4B9 64/128 NUMBER FORMATTER

Since Basic 2.0 and Basic 7.0 on the C-64 and C-128, respectively, lack a command for automatically printing large numbers with commas, I wrote Number Formatter to perform that task. Use it as a subroutine in your own programs and you'll find it'll format any positive or negative floating point number from 0.01 to 999999999.

```
0 REM NUMBER FORMATTER - J. R. CHARNETSKI
                                     :REM*21
10 INPUT"ENTER A NUMBER";N:IFN=0THENEND
                                    :REM*242
20 GOSUB40:PRINT:GOTO10             :REM*220
30 :                                 :REM*88
40 N$=STR$(N):IFABS(N)<1000GOTO90 :REM*236
50 X=3:L=LEN(N$):IFN=INT(N)GOTO80 :REM*174
60 FORJ=2 TO L:IF MID$(N$,J,1)="."THENX=X+
   L-J+1:J=L                        :REM*130
70 NEXT                             :REM*200
80 IFX<L-1THENN$=LEFT$(N$,L-X)+","+RIGHT$(
   N$,X):L=L+1:X=X+4:GOTO80         :REM*213
90 PRINTN$:RETURN                   :REM*172
```

—JOSEPH CHARNETSKI, DALLAS, PA

$4BA HOW CONVE-E-E-ENIENT!

Good programmers always save the newest version of their creations under slightly different filenames as they work. And they save frequently. You can save time if you make your computer do this for you by tacking on my routine to your programs. For the C-64:

```
59999 END
60000 ZZ$="FAST SAVE":OPEN15,8,15,"S0:"+ZZ$:SAVE""+
      ZZ$,8:VERIFY""+ZZ$,8
60001 CLOSE 15:END
```

For the C-128:

```
59999 END
60000 ZZ$="FAST SAVE":SCRATCH""+ZZ$:DSAVE""+ZZ$:
      DVERIFY""+ZZ$:END
```

Substitute your own filename for "FAST SAVE" and enter RUN 60000 whenever you want to save a program. This eliminates encountering the Save-with-Replace bug and filling your disk with partially completed program segments.

—E. STUART JOHNSON, ATHENS, AL

$4BB PUTTING THE C-64'S BELL TO WORK

A Magic trick rang the C-64's pseudo-CTRL/G bell for the first time in January 1988 (Magic trick $467) and for the second time in April 1988 (Magic trick $48F). I'll ring it for the third and last time in this issue with a relocatable machine language routine.

Incorporate my bell program into your own programs to signal keyboard input, or perhaps to toll that all is either well or not well.

After you've run the program, type in SYS SA to activate the bell. Of course, you can change the value of SA to your preferred, least disturbed area of memory.

```
0 REM PUT THE BELL TO WORK - ROLF L. MILLE
  R                                 :REM*217
10 SA=679:FORA=SA TO SA+30:READD:POKEA,D:N
   EXT:SYSSA                         :REM*43
20 DATA 169,31,141,24,212,169,9,141,5,212,
   169,0,141,6,212                  :REM*183
30 DATA 169,48,141,1,212,169,32,141,4,212,
   169,33,141,4,212,96               :REM*30
```

—ROLF L. MILLER, VENTURA, CA

$4BC C-64 NO-SCROLL CONTROL

One of the many nice features of the C-128 is its no-scroll key. Located at the top of the keyboard, this key lets you freeze scrolling listings, disk directories and other screen data, and then resume scrolling when you're ready. Because it's so useful, I've created a no-scroll system for the C-64 called No-Scroll Control.

After activating my program, CTRL/S freezes scrolling. You can resume scrolling with the space bar. Pressing run-stop/restore deactivates the program and entering SYS SA reactivates it.

```
0 REM C-64 SCROLL CONTROL - KARL JOHNSON
                                   :REM*44
10 SA=49152:FORM= SA TO SA+52:READN:CK=CK+
   N:POKEM,N:NEXT                  :REM*250
20 IF CK<>6300 THEN PRINT"ERROR IN DATA...
   ":END                           :REM*123
30 SYS SA:PRINT"{SHFT CLR}CONTROL SCROLL (
   CTRL-S) ACTIVATED. SPACEBAR CONTINUES L
   ISTING":END                     :REM*30
40 DATA 120,169,13,141,20,3,169,192,141,21
   ,3,88,96,165,145,201,251,208    :REM*26
50 DATA 27,165,197,201,13,208,21,120,169,4
   9,141,20,3,169,234,141,21,3     :REM*111
60 DATA 88,165,197,201,60,208,250,32,0,192
   ,169,0,133,198,76,49,234        :REM*211
```

—KARL L. JOHNSON III, HOUSTON, TX

$4BD LOOK AWAY, DIXIELAND

Dixie, an inspirational song written by Daniel Decatur Emmett in 1859, is a favorite among children of all ages. This version works on both the C-64 and the C-128. For a snappier tempo, run it in the C-128's Fast mode.

```
0 REM DIXIE FOR THE 64 & 128 MODES - JOE C
  HARNETSKI                        :REM*253
10 DATA 11221111222222231311111511511 5116
                                   :REM*80
20 DATA 54333344555455555556678656545343
                                   :REM*38
30 DATA 24555946222488828285977929242945
                                   :REM*254
40 CLR:READD$,IX$,IE$:R=54272:FORI=RTOR+23
   :POKEI,0:NEXT:POKER+12,9:POKER+24,15
                                   :REM*7
50 FORJ=1TO32:POKER+8,VAL(MID$(IX$,J,1))*1
   0+VAL(MID$(IE$,J,1)):POKER+11,33
                                   :REM*176
60 FORT=1TOVAL(MID$(D$,J,1))*128:NEXT:POKE
   R+11,32:FORZ=1TO20:NEXT:NEXT    :REM*52
70 PRINTCHR$(147)"PRESS SPACEBAR TO PLAY D
   IXIE AGAIN..."                  :REM*137
80 GETA$:IFA$="" THEN 80           :REM*79
90 PRINTCHR$(147):IFA$=CHR$(32) GOTO40:END
                                   :REM*60
```

—JOSEPH CHARNETSKI, DALLAS, PA

$4BE MORE NO-SCROLL CONTROL?

This program allows you to put a message on the C-64 screen without changing the current location of the cursor.

Add the subroutine in lines 60000–60040 to your program. To print a message, use the syntax:

X = (0 through 39): Y = (0 through 24):A$ = "ANY MESSAGE DESIRED":GOSUB 60000

where X is the column coordinate and Y is the row coordinate for the position of your message in A$.

```
0 REM 64 NO-SCROLL CURSOR PLOT - RICHARD P
  ENN                              :REM*33
10 PRINTCHR$(147):PRINT"CURSOR IS HERE--->
   ";:WAIT 198,1:GETA$             :REM*113
20 X=31:Y=24:A$="NO-SCROLL":GOSUB60000
                                   :REM*83
30 WAIT 198,1:GETA$:PRINT"AND STAYS HERE"
                                   :REM*123
40 END                             :REM*168
59999 REM NO SCROLL PLOT SUBROUTINE
                                   :REM*201
60000 X1=PEEK(211):Y1=PEEK(214)    :REM*208
60010 PRINT"{HOME}":F=1024+X+Y*40:H=INT(F/
      256):L=F-H*256:POKE209,L:POKE210,H
                                   :REM*42
60020 PRINTA$                      :REM*16
60030 POKE 211,X1:POKE 214,Y1:PRINT"{CRSR
      UP}{CRSR DN}                 :REM*202
60040 RETURN                       :REM*253
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$4BF REVERSING C-128 HI-RES SCREENS

Reversing a hi-res image on the C-128's screen isn't easy; in fact, it's downright difficult. To make the job easier, I'm offering the C-128 Hi-Res Screen Reverser. You define the top-left corner coordinate values of X and X1 (0–39) and Y and Y1 (0–24). After defining your coordinates, entering SYS 4864,X,Y and SYS 4871,X1,Y1 reverses that area of the screen.

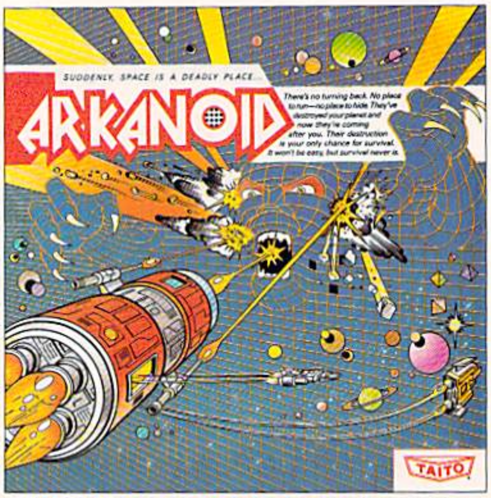
```
0 REM C-128 SCREEN HI-RES SCREEN REVERSER
  - ROBERTO HIRSCH                 :REM*11
10 FOR X=4864 TO 5044:READ A:CK=CK+A:POKE
   X,A:NEXT                        :REM*59
20 IF CK<> 24402 THEN PRINT"ERROR IN DATA.
   ..":END                         :REM*204
30 DATA 133,250,133,254,134,251,96,133,252
   ,134,253,165,251,141,241,17     :REM*252
40 DATA 74,74,24,109,241,17,141,241,17,165
   ,251,10,10,10,10,10             :REM*85
50 DATA 10,141,240,17,169,0,141,246,17,169
   ,32,36,250,240,5,169            :REM*111
60 DATA 1,141,246,17,165,250,10,10,10,141,
   245,17,24,173,240,17            :REM*195
70 DATA 109,245,17,141,243,17,169,32,109,2
   41,17,109,246,17,141,244        :REM*41
80 DATA 17,173,243,17,141,102,19,141,107,1
   9,173,244,17,141,103,19         :REM*42
90 DATA 141,108,19,162,0,189,248,60,73,255
   ,157,248,60,232,224,8           :REM*166
100 DATA 208,243,165,250,197,252,240,5,230
    ,250,76,36,19,165,254,133      :REM*19
110 DATA 250,230,251,162,0,238,240,17,232,
    173,240,17,201,0,208,3         :REM*185
120 DATA 238,241,17,224,0,208,238,162,0,23
    8,240,17,232,173,240,17        :REM*112
130 DATA 201,0,208,3,238,241,17,224,64,208
    ,238,165,251,197,253,208       :REM*228
140 DATA 1,96,76,36,19             :REM*178
150 COLOR 0,2:COLOR 1,1:GRAPHIC 1,1 :REM*8
160 X=1:Y=1:X1=10:Y1=10            :REM*174
170 SYS4864,X,Y:SYS 4871,X1,Y1     :REM*153
```

—ROBERTO HIRSCH, PANAMERICANA, ARGENTINA

Continued on p. 81.

WHAT'S A TAITO®?

That's a very good question. Taito (pronounced Tie-toe) is one of the oldest and biggest names in the arcade industry. We're the world's largest manufacturer and operator of arcade games. Taito's been in the business since 1953.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ARKANOID
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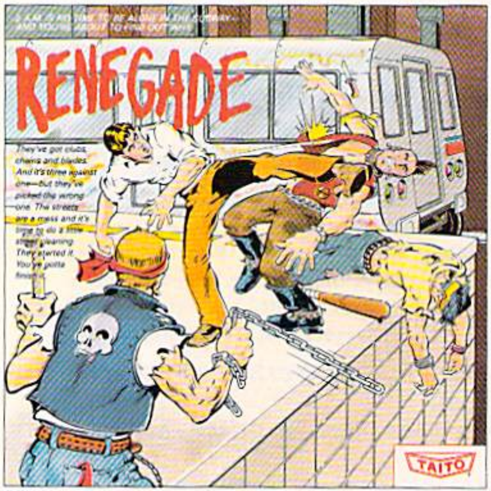
RENEGADE
They've got clubs, chains and blades. And it's three against one—but they've picked the wrong one. The streets are a mess and it's time to do a little street cleaning. They started it. You've gotta finish it.
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RENEGADE: This is the one and only. Don't settle for imitations. Blistering, fast paced and real life street-style Karate action. One of the hottest games in Europe.

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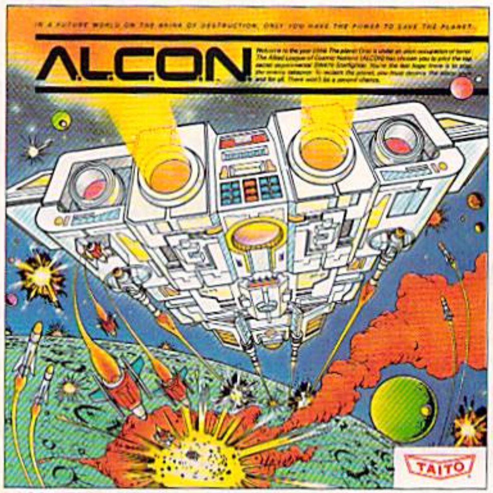
Our strength comes from the massive development effort we put into creating the kind of games that satisfy the ever-growing arcade appetite and the research gathered from the more than 100,000 arcade machines Taito operates in Japan. (The money in the coin boxes at the end of the day tells you quickly if you've got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a good game or not.) And Taito is always working hard to develop the most exciting new video games that push the technology to its limits. We don't rest on our laurels.*

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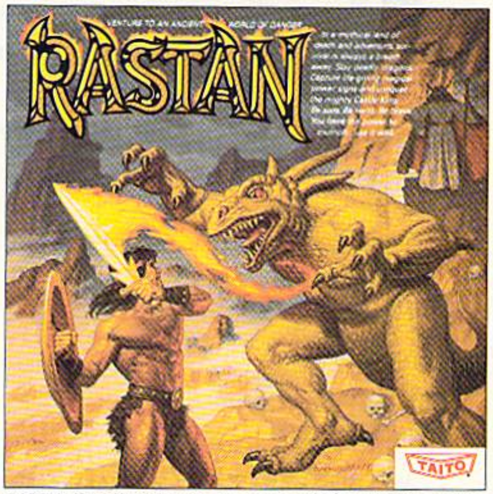
VENTURE TO AN ANCIENT WORLD OF DANGER
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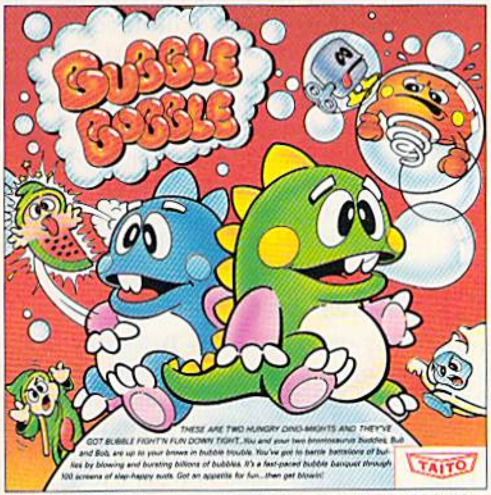
BUBBLE BOBBLE
THESE ARE TWO HUNGRY DINO-MIGHTS AND THEY'VE GOT BUBBLE FIGHT'N FUN DOWN TIGHT...You and your two brontosaurus buddies, Bub and Bob, are up to your brows in bubble trouble. You've got to battle battalions of bubbles by blowing and bursting billions of bubbles. It's a fast-paced bubble banquet through 100 screens of slap-happy suds. Got an appetite for fun...then get blowin'!
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SIMPLIFIED TUTORIAL FOR BASIC 8

VANCOUVER, WA—*The Beginner's Guide to Basic 8* has been published as a companion text to supplement the user's manual of that popular and powerful C-128 programming environment. The Guide provides simple examples of the command syntax that many people have found too vaguely described in the Basic 8 manual. The Guide thoroughly documents a series of illustrative programs that appear on an accompanying disk, the back side of which contains the contents of the public domain Basic 8 Demo Disk, used by permission of Lou Wallace, Basic 8's co-author. The package is available for $19.95. Software Support International, 2700 NE Andresen, Vancouver, WA 98661.

Check Reader Service number 400.

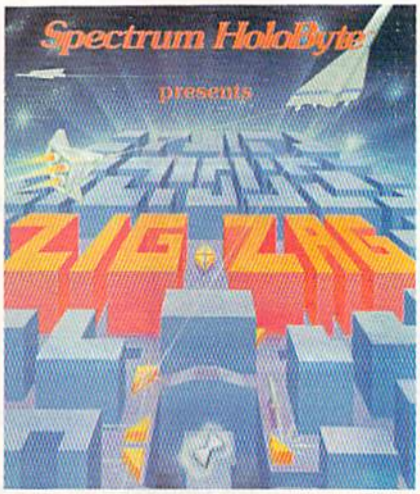
SPEECH REVIEW

LONG BEACH, CA—The Computerized Speech/Language Screening Program are two separately available disks that can help identify possible speech and language problems in preschoolers and children in grades K–3. The programs were developed by a licensed and certified speech pathologist specifically for the non-speech professional. Each disk contains directions, screening form, authorization letter for parents, a printable handout called "Ten ways to increase your child's speech skills" and a glossary of terms. All items have on-screen/hard-copy options. Each disk is available for the C-64 for $15 from Hilltop Speech and Language Services, 3330 Lewis Ave., Long Beach, CA 90807.

Check Reader Service number 402.

FIND THE EIGHT CRYSTALS OF ZOG

ALAMEDA, CA—Spectrum HoloByte (2061 Challenger Drive, Alameda, CA 94501) has released Zig-Zag, an arcade-style game for the C-64. In this British import, you must swiftly maneuver your star fighter down the narrow passageways of the Matrix of Zog somewhere in the 12th dimension. The ultimate test of your mental and physical abilities is to locate the Eight Crystals of Zog. You will need to collect cash by conquering aliens and use it to buy items that will prove helpful in your quest. A scoring system is included in the game to keep track of the points you accumulate for precision and fast reflexes. Test your mettle for $24.95.



Disappearing barriers, traps and timelocks add to the lure of Spectrum HoloByte's arcade-action game, Zig-Zag.

Check Reader Service number 401.

WORLD WAR II EUROPE

BALTIMORE—Underfire!, a WWII war simulation, has paratroops, engineers and mountain troops from the United States, Germany and the Soviet Union for you to use to wreak havoc on the European landscape with assault guns, tanks, machine guns, bazookas, smoke grenades and satchel charges. You, of course, control the action in nine scenarios, and a construction set lets you create more. You can throw in some armor and a couple of good leaders, choose the weather, scale, general orders and victory conditions; in short, make life miserable for the enemy. With a C-64, you can start firing away for $34.95. The Mapmaker disk is available separately for $35. From the Avalon Hill Game Company, 4517 Harford Rd., Baltimore, MD 21214.

Check Reader Service number 404.

A DIFFERENT DRUM

LA CROSSE, WI—Consort Software (PO Box 1623, La Crosse, WI 54601) has released Corquest of the 80s and Corquest of the 70s, drum corps simulations for the C-64. Corquest challenges your knowledge of junior drum corps history and incorporates color graphics and three-part harmonic custom music. You also become director of your own corps, choosing your staff and assembling your marching members. You'll need to drum up $24.95 for each package or $39.95 for both versions.

Check Reader Service number 403.

DRIVE BOX

FARGO, ND—The Drive Box, a hardware configuration for the 1541, 1571 and C-128D disk drives, has been released by Microteq (1430 9th Ave. South, Fargo, ND 58103). With it, you can set any device number from 8 to 11, and it will defeat write-protect so that you can write to the unnotched side of your disks. An instruction manual shows you how to make the required solder connections to your drive's circuit board, but the company will install it for you for a $10 fee. The Drive Box is available for $29.95.

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COMPUTER LEARNING MONTH

PALO ALTO—Continuing its effort to encourage more educators to discover the many uses of computers and software in the classroom, Computer Learning Month (CLM), October 1988, has launched a School Certification Program and Sweepstakes.

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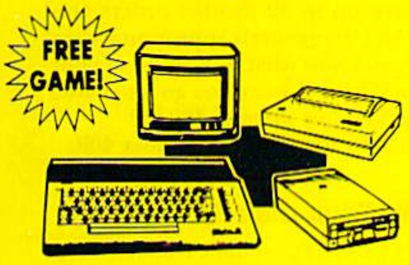

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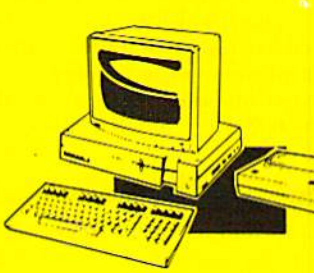

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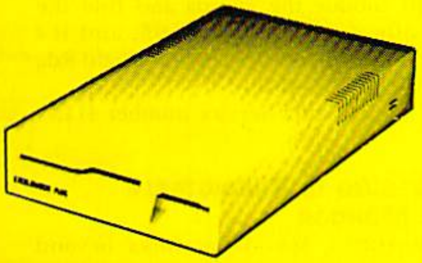

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grams they've never tried before. To confirm a school's eligibility, school principals must sign a CLM Certified School Program entry form indicating that all teachers in their schools have met the requirements. Entry forms must be mailed to CLM by October 31, 1988. For more information and a free entry form, write to Computer Learning Month, PO Box 60007, Palo Alto, CA 94306.

SUCCESSFUL COMMUNICATION

ELLISVILLE, MO—If you're an amateur radio operator with a C-64, you can communicate via transponders and BBS-like systems found on various amateur radio communications satellites. The program, Satcomm-64, tracks satellites in order to find the best time to receive a successful communication via antennas. The software can store information on up to 15 satellites, confirm W1AW reference orbits, provide a hard copy of up to 31 days of access times and give information for any given day of access times for up to three satellites. The program is compatible with a system consisting of a C-64, 1541 drive and a 1525-emulating printer. It's $18.95 from Strategic Marketing Resources, PO Box 2183, Ellisville, MO 63011.

Check Reader Service number 406.

COMPUTERS IN THE CLASSROOM

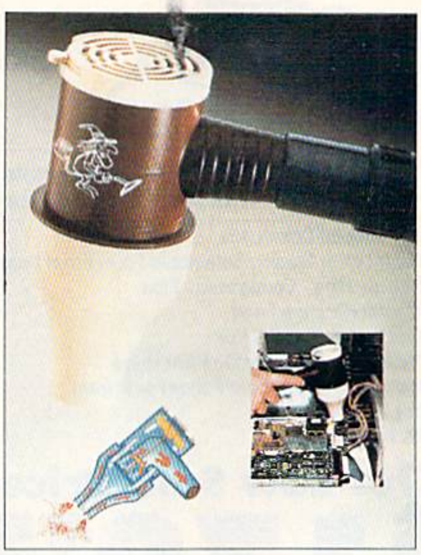
PLEASANTVILLE, NY—Sunburst (Pleasantville, NY 10570) is offering teachers a free quarterly newsletter, called *Solutions*, that provides ideas on using the computer in the classroom. Each issue covers tips for successful teacher-training workshops, the use of the computer to develop reading skills, current issues in teaching keyboarding, how to observe intelligent behavior in children, the database as a critical thinking tool and using software to prepare for the school science fair.

Regular features include "Classroom Secrets," with computer-use ideas; "What's Happening," which shares with readers news from Sunburst; and a "Q and A" page with the company's Customer Service representative.

To get a free subscription, call Sunburst toll-free at 800-431-1934, and in Canada, 800-247-6756.

EAT MY DUST

CALGARY, ALBERTA—The Dust-Witch 2000, an attachment for your vacuum cleaner, eats dust from your computer and peripherals without touching delicate surfaces. It delivers both blowing and suction power at the same time so that the dust is blown up away from the computer unit and absorbed. The Dust-Witch can be switched to suction only and the blowing power is variable. It's available for $24.95 (in U.S. funds) from Garnet Projects, PO Box 30241, Station B, Calgary, Alberta, Canada T2M 4P1.



The Dust-Witch 2000 from Garnet Projects zaps hard-to-reach dust.

Check Reader Service number 408.

TEST YOUR RACING SKILLS

SAN JOSE, CA—In Speed Buggy, an arcade-style racing simulation for the C-64, you select one of five tracks, each featuring terrains more difficult than the previous, with sharper curves and additional obstacles. You're to complete a course as quickly as possible, while avoiding fallen trees, boulders and other obstacles. You can put the pedal to the metal for $29.95. It's from Data East USA, 470 Needles Drive, San Jose, CA 95112.

Check Reader Service number 407.

"BLOOD AND GUTS" VS. "DESERT FOX"

SAN MATEO, CA—Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404) introduces Patton vs. Rommel, an historical battle simulation for the C-64. The time is D-Day in Normandy, France, and your mission is to become either General George "Blood and Guts" Patton, Commander of the American Forces, or Field Marshall Erwin "Desert Fox" Rommel, Commander of the German Seventh Army, and battle your opponent for the future of Europe. As commander, you have numerous divisions at your disposal and 15,000 locations to follow. With ten different kinds of tactical orders, each division can have up to 32 distinct orders at a time. And the generals appear on screen to let you know what they think of your tactics. Where else can you go into battle for the low, low price of $29.95?

Check Reader Service number 409.

CP/M FOUR-DISK SET

TALLEVAST, FL—Public Domain Solutions (PO Box 832, Tallevast, FL 34270) has released The PDS CP/M Starter Set for the C-128. The four-disk set contains utilities and applications, plus printed documentation that explains the history of CP/M, booting up, transient and resident commands, creating and dissolving library files and how to run software. The set is available for $29.95.

Check Reader Service number 410.

FIND THE FOUR SCROLLS

PENFIELD, NY—Magic Madness, a game for the C-64, takes place in Neverland, where four kindly magicians used to rule, with their knowledge derived from four magic scrolls. The wicked sorcerer Colo has killed them and hidden the scrolls in a burrow guarded by an army of henchmen. Armed with four magic weapons, you must subdue the guards and find the scrolls. Conjure up $19.95, and it's yours. From Artworx, 1844 Penfield Rd., Penfield, NY 14526.

Check Reader Service number 411.

NOTHING IS PREDICTABLE IN MORDOR

READING, MA—What lurks beyond the gloomy marshes? Is it possible to escape from the dreaded Nazgul? To find out, continue the quest into the depths of Middle-earth with The Shadows of Mordor, the third J.R.R. Tolkien C-64 adventure from Addison-Wesley (Reading, MA 01867). In this part of the journey, players must tame the stealthy Smeagol, outwit the Black Riders at every turn and defeat the monstrous spider Shelob. You'll descend treacherous cliffs, navigate deadly swamps, catch your own food, solve the mysteries of winding underground tunnels and then sneak through the evil city of the Nazgul, all to keep the Ring from the greedy clutches of the Dark Lord, Sauron. Begin your grand adventure for $29.95.

Check Reader Service number 412.■

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MAIL RUN

Birthday newsletters, what online services really cost, and more controversy over the Save-with-Replace bug.

ONLINE NETWORK CHARGES

In your Telecomputing Workshop of May 1988, you did a cost comparison of Q-Link and GEnie in reply to a reader's question. The registration fee in the cost comparison chart is incorrect. As of January 1, GEnie's fee increased to $29.95. This new rate comes with two non-prime time free hours (including a $10 usage credit), a new GEnie user's manual and a subscription to GEnie's LiveWire Newsletter.

—STEVE HARACZNAK
MANAGER, PRESS RELATIONS
GENIE

In the May Telecomputing Workshop, RUN compared the costs of using two online services. The assumptions used were misleading, so readers were left with the impression that Q-Link and GEnie cost about the same. In fact, Q-Link can be considerably less expensive.

For a $9.95 monthly membership fee, Q-Link members get unlimited free use of a basic tier of services, including such features as news, an encyclopedia and a direct hotline to Commodore's customer support service. Members can use these services as much as they like and never pay any extra charges. A member could, for example, use the encyclopedia every night for a month and still pay only $9.95.

If someone chooses to use our extra-cost "Plus" services exclusively, then the cost of using Q-Link and GEnie would be roughly the same, which is the example your columnist used. However, since most people would, in fact, use the free Q-Link services some of the time, and Q-Link is the only network to offer such free services, for most users, Q-Link will cost less.

—STEPHEN M. CASE
EXECUTIVE VICE PRESIDENT
QUANTUMLINK

USER'S GROUPS REVIEWED

I think that your articles about user's groups were poorly done. They neglected to give effective methods to attract new members and mention the legal standpoints that can affect groups.

—JOSH JACOBY
ASSOCIATION FOR SHARING
COMMODORE INFORMATION
RANCHO CUCAMONGA, CA

I was glad to see your article, "Starting a User's Group," in the April 1988 issue. After I read it, however, I was disappointed. The hints for starting a user's group were fine, but it didn't have any new information. Also, in the April Coming Attractions (March 1988 issue) you say you will include a list of user's groups. Please correct this.

—AARON PEROMSIK
WORCESTER, MA

The user's group listing was humongous, which would have meant deleting another article or program listing to accommodate it. However, you can still get a list of the user's groups in the states you specify by sending a self-addressed, stamped, business-size envelope to Beth Jala, RUN Magazine, 80 Elm St., Peterborough, NH 03458. We apologize for the inconvenience.

—EDITORS

WATCH THOSE ,S AND OS!

RUN Technical Editor Tim Walsh's considerate attention to my problem with *RUN*'s Checksum program is most appreciated. The period I typed in place of a comma in a Data statement prevented the program from running. Once I made the correction, I was able to complete typing in the Memo Book program, which had stalled because of a similar error: I had typed in an O and a 0 instead of two 0s. The Checksum program helped me find and correct this error, so I'm doubly indebted to you.

—CHARLES S. REID
LAS VEGAS, NV

WHERE'S THE SOFTWARE?

I have a pet peeve that I would like to share with you concerning software publishers. Whenever a publisher advertises a new software package, it turns out that it's not yet available. Since there are no software dealers in my area, I'm forced to make my purchases from mail order firms. It's very frustrating to order something and then get a card saying that the product won't be available for three or four months. I think the ad should include an approximate date of release, or at least a statement explaining that it's not yet available.

—PENNY DEGROFF
GARFIELD, AR

WHERE'S THE C-128 SOFTWARE?

How about more coverage and programs for the 128 mode? I like my C-128 and have no desire to change to another machine, but I think it's about time both magazines and software manufacturers stopped ignoring us.

—ROBIN CHRISTIAN
APO, NY

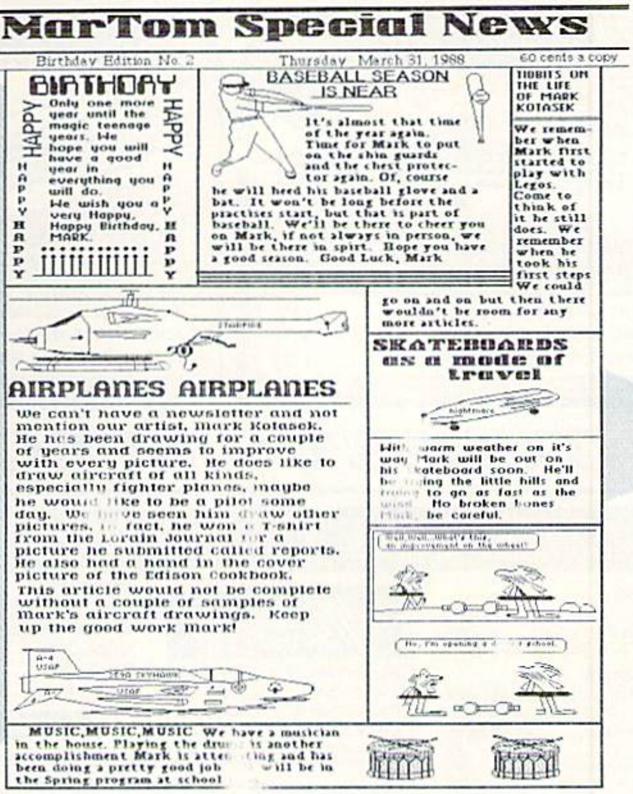
I've noticed the many good business and productivity programs that have been released for the C-128, which is good news if you want to type letters or balance your budget. But if you want to entertain yourself, you usually have to switch to C-64 mode to play most games.

If C-128 users get together and write to or call entertainment software companies, we might begin seeing games for the 128 that take advantage of the faster microprocessor and disk drive and greater memory capacity.

—BROOKE WHEELER
JACKSON, CA

Over the last year, I've been amused to read letters, both in your Mail RUN column and in other magazines, about the "lack of software" for the C-128. There have been a good number of 128 titles available for some time. I think this will continue to improve, but they'll never reach the number of C-64 titles many users may be hoping for.

It doesn't make a lot of sense to convert every C-64 title to run in 128 mode. If a software developer can sell all Com-



MarTom Special News

Birthday Edition No. 2 · Thursday March 31, 1988 · 60 cents a copy

BIRTHDAY

Only one more year until the magic teenage years. We hope you will have a good year in everything you will do. We wish you a very Happy, Happy Birthday, MARK.

BASEBALL SEASON IS NEAR

It's almost that time of the year again. Time for Mark to put on the shin guards and the chest protector again. Of, course he will heed his baseball glove and a bat. It won't be long before the practises start, but that is part of baseball. We'll be there to cheer you on Mark, if not always in person, we will be there in spirt. Hope you have a good season. Good Luck, Mark

TIDBITS ON THE LIFE OF MARK KOTASEK

We remember when Mark first started to play with Legos. Come to think of it he still does. We remember when he took his first steps We could go on and on but then there wouldn't be room for any more articles.

AIRPLANES AIRPLANES

We can't have a newsletter and not mention our artist, Mark Kotasek. He has been drawing for a couple of years and seems to improve with every picture. He does like to draw aircraft of all kinds, especially fighter planes, maybe he would like to be a pilot some day. We have seen him draw other pictures, in fact, he won a T-shirt from the Lorain Journal for a picture he submitted called reports. He also had a hand in the cover picture of the Edison Cookbook. This article would not be complete without a couple of samples of Mark's aircraft drawings. Keep up the good work Mark!

SKATEBOARDS as a mode of travel

With warm weather on it's way Mark will be out on his skateboard soon. He'll be [illegible]ing the little hills and trying to go as fast as the wind. No broken bones Mark, be careful.

MUSIC,MUSIC,MUSIC We have a musician in the house. Playing the drums is another accomplishment Mark is attempting and has been doing a pretty good job [illegible] will be in the Spring program at school

HAPPY
HAPPY
A-4
USAF
Well Well...What's this, an improvement on the wheel?
No, I'm opening a d[illegible] school.

First-time desktop publisher Tommer enjoyed making birthday newsletters for her grandchildren, using Berkeley Softworks' geoPaint program.

modore users a 64 version of a title, why should they release a 128 version? Where's the added value?

The 128's special features are not available to every 128 owner, which should limit software development to a degree. The 1571 is terrific for its high capacity, but many 128 owners still use the 1541. I've yet to find a 128 package that utilizes true Double-Sided mode. The feature that *should* be built into software is to recognize the 1571 for saving and retrieving files from both sides, particularly for productivity and business packages. Another capability is the 80-column, high-resolution color, but not all users have a monitor for this. Why should developers go after these features in a title if a lot of users do not have all the little goodies that make them work?

Let's all just hope that 128 users stop beating the drum where it doesn't make sense and be thankful that Commodore delivered a machine that plays both 64 and 128 modes (not to mention the pretty much ignored CP/M mode).

—GARY MCKAY
ROWLAND HEIGHTS, CA

TO SAVE-WITH-REPLACE OR NOT TO SAVE-WITH-REPLACE?

I've been reading articles in *RUN* and listening to Commodore users over the years about this Save-with-Replace bug. I've been using Save-with-Replace for four years now with no problems.

Problems occur only when the syntax SAVE"@:PRG.NAME",8 is used. That's good, but one character is missing. . .0! Nobody seems to include the zero to designate which drive the DOS is supposed to send the information to. People take for granted that the DOS will place the zero in there for them. The DOS used in Commodore drives today is the same DOS that was used in the old PET computers, which had *two* drives. You still need to use the drive designator even though there is only one drive in the system.

—DONALD E. LACOURSE, SR.
MIDWEST CITY, OK

I read with dismay the letter concerning identification of the infamous Save-with-Replace bug. I've been using Save-with-Replace since 1983, and I've never been "bitten."

Save-with-Replace does not have a bug. It's the misuse of it that causes problems. When people try to use this procedure with a disk that's almost full or try with incorrect syntax, they create their own bug. It is not in the system.

All you have to do is use Save-with-Replace properly and every once in a while validate or clean up your disks, and you should have no problem.

—FREDERICK R. CLAUS
FRANKFORT, KY

Probably no other Commodore computer-related topic brings out more controversy than the Save-with-Replace bug. Our advice is never, repeat, never use Save-with-Replace on any Commodore computer or disk drive.

—EDITORS

PRINTER DRIVER FOR GEOS 128

I read the March 1988 geoWatch column and just want to tell you that there is a printer driver for 24-pin printers. It's the Star NB-15 printer driver, which also supports the Epson LQ series of printers.

The driver prints at about 90 dpi, so Paint and Write documents are smaller than normal (80 dpi).

Although the Paint documents look good, I wish I could use the full capabilities of my printer, which can print up to 360 dpi.

—GEORGE LEONG
LOS ANGELES, CA

BIRTHDAY NEWSLETTERS

Susan Lamb's article, "geoNewsletter" (March 1988), greatly interested me. I decided to give it a try. Instead of making ordinary birthday cards for my grandsons, I made them "birthday newsletters," using Berkeley Softworks' geoPaint program. I created all the graphics and wrote articles I thought would interest them. When they received the newsletters, they didn't want to put them down and open their gifts.

As you can see, my first attempt wasn't too bad. Ms. Lamb had very good step-by-step instructions. Please thank her for me.

—MARGARET TOMMER
AVON LAKE, OH

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

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Compiled by BETH S. JALA

SHERLOCK: THE RIDDLE OF THE CROWN JEWELS .... A

The Number Two Man Finally Gets His Time in the Sun

"Come, Watson, the game's afoot!"

How long has it been since you've heard those words? Holmes has been hiding away in his digs, having apparently lost all interest in life since his retirement. Your life has been nothing to rave about either.

But now the Prime Minister has brought you a case that nobody else in the world could possibly solve. To make life even sweeter, Holmes has turned the case over to you. He is going to be *your* assistant for a change.

There have been several attempts to turn Sherlock Holmes into a computer game. Infocom's is a success because, for the first time, the player is taking on the character of Dr. Watson instead of the great detective. Watson, of course, is a much more likeable character than the moody, overbearing and somewhat manic Holmes. Plus, everything from the artwork on the box to the atmosphere generated by the stunning prose flawlessly recreates the flavor of Sir Arthur Conan Doyle's London of the late 1800s. As you wander around the fog-shrouded streets in the dead of night, you'll find yourself looking over your shoulder at every little noise.

The story begins in the pre-dawn hours on a Saturday, outside of Holmes' famous 221B Baker Street address. Before 9 o'clock Monday morning, you'll have visited some of the most historic, and some of the seediest, sites in London. Along the way, you'll suddenly find you're on your own because Holmes has been kidnapped! Fortunately, one of the Baker Street Irregulars will help you.

While none of the puzzles in the game is especially difficult, they're all true to the style of the original Sherlock Holmes stories. Most can be solved by using observation and logic; some of the puzzles can only be settled by having a general knowledge of British history. None of the details goes beyond what you probably learned in high school, but some reference material might come in handy. There is one ringer in the game, however—one item you'll need is almost impossible to find unless you've read the Holmes story, *A Scandal in Bohemia*. Well, not quite impossible.

This is another Infocom story that includes on-line hints, which is a controversial subject among adventure gamers. Some feel that the mere availability of hints as you're playing is too much of a temptation. However, if you find the temptation too much, you can disable the hints whenever you start playing. As with Infocom's famous Invisiclues, the on-line hints are progressive—they start out being subtle, but end with the outright solution. That way, you can read only as much as you need and no more.

As is usual with Infocom stories, the packaging is half the fun. Included with Sherlock is a facsimile of the "London Thames," a tourist map of the area you'll be exploring and a nifty detective-type key fob. The newspaper and the instruction booklet both contain vital clues to solving the game—and are a lot of fun to read!

Infocom deserves another feather in their cap for this one. *(Infocom, Inc., 125 Cambridgepark Drive, Cambridge, MA 02140. C-64/$34.95.)*

—ART LEWIS KIMBALL
TUSCOLA, IL

STEALTH MISSION .... A

Get Ready for Fast, Concentrated Flight Action!

Any company currently producing flight simulation software for Commodore computers won't be happy to hear about SubLogic's release of Stealth Mission. Not only does this simulator offer players ten difficulty levels, eight combat missions, in-flight refueling and a choice of three aircraft, but it is also one of the only mass-produced software packages to operate in both 64 and 128 modes!

Flying your Stealth Mission aircraft is mentally challenging and involved, but getting off the ground with the program is easy. Loading with a C-64 requires the usual LOAD"*",8,1. However, the program autoboots on a C-128 in a fraction of the time. ►

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A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
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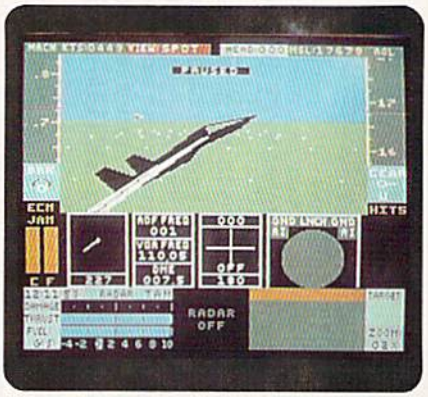


A range of flight instruments is at your disposal in Stealth Mission.

The single, unnotched disk that accompanies the 72-page operating manual contains both the C-64 and C-128 versions of the program. Disk access times aside, no operating differences exist between the 64 and 128 versions of Stealth Mission. No matter which Commodore you use it on, all of Stealth Mission's controls and flight options are similar. Stealth Mission's package also comes complete with fold-out maps that show the general locations of bases, bridges and mountains.

For relaxing flight activities, you can use Stealth Mission with SubLogic's Scenery Disks. Undoubtedly, however, the majority of armchair aviators will buy Stealth Mission to engage in combat, not to tour San Francisco. You can choose from missions that include supersonic dog fights and high altitude bombings.

After deciding on a mission, you then select a skill level and an aircraft armed with missiles, bombs and other weapons. The take-off weight of your aircraft increases with the addition of each piece of armament. You'll need to remove some of the fireworks if you exceed the maximum gross weight of the aircraft.

Each of the three Stealth Mission aircraft is a supersonic jet possessing its own particular combination of weapon payload capacity and performance and handling characteristics. The F-19 Stealth fighter is agile and not easily detected by enemy radar, but is rather slow in accelerating. The F-14 is equipped with thrust-inducing afterburners and is noticeably faster than the F-19. The experimental X-29 falls somewhere between the other two. Although fitted with afterburners, it lacks the weapon payload capabilities of the F-14, but compensates somewhat with faster vertical acceleration. Despite these performance differences, all three jets are flown in the same manner, using the same sequence of controls.

The program has well-detailed graphics, both in and out of the cockpit, as well as various viewing options. Be forewarned, however, that you'll have little time to admire the scenery before life becomes very busy in the cockpit. Depending on your flight-mode selection, some 25 instruments, including an airspeed indicator, a radar display, a weapons cycling window and a target-tracking computer, all bid for your attention.

Because of the complexity of the navigational procedures required for each mission, I still feel ill-prepared, even after dozens of flights, unless I have the operating manual close by for reference. Individually, the controls aren't difficult to learn to use, especially if you've had experience with Flight Simulator II. However, taken as a group, these navigational aids can intimidate computerists who lack a commercial pilot's license.

Along with understanding the Automatic Direction Finder (ADF) systems—used to tune on non-directional radio beacons to keep track of your position in relation to your home base and airborne refueling tankers—you need to know how to read the aircraft's Very High Frequency Omnidirectional Range (VOR) Indicator. This instrument enables you to determine your aircraft's position in relation to VOR ground-based radio stations. Heading into enemy territory also requires that you understand how to read your aircraft's raw scope—a display of multiple lines on a standard radar scope that indicate how many enemy radar systems are tracking your aircraft.

Taking off and flying demands little more than applying full power and pulling back on the joystick as you near the end of the runway. Flying to within shooting range of your destination can be the start of all sorts of trouble in the more advanced skill levels, mainly because the presence of your jet attracts surface-to-air missiles and enemy fighters. Regardless of what aircraft you're flying, it's a good idea to maintain low altitude in hostile territory.

The shooting process requires more involvement than just pointing your aircraft in the general direction of the target and rapidly pressing the fire-button. You must use your aircraft's target-tracking computer.

Stealth Mission is complicated and demanding, almost guaranteed to turn quite a few joystick jockeys into profoundly confused novice fighter pilots in a matter of minutes. I'm not proud to admit that my flight skills with Stealth Mission are in need of vast improvement. Nevertheless, Stealth Mission's detail and sophistication are most welcome. It quickly makes the user painfully aware that today's air-combat rules have all been rewritten. *(SubLogic, 713 Edgebrook Drive, Champaign, IL 61820. C-64, C-128/$49.95.)*

—Tim Walsh
RUN Staff

MISL Soccer .... B+

Congratulations! You Have Just Been Awarded....

Great news! It's a letter from the Office of the Commissioner of the Major Indoor Soccer League (MISL) telling me I've been awarded a franchise!

The letter points out that mine is one of 12 teams in the league and, as the newest, will probably be the weakest. But the Commissioner's Office goes on to say that it has a lot of faith in me and that with my talent as an owner/general manager, head coach and player, the team should eventually do well.

Okay, I haven't *really* been awarded an MISL franchise. The letter I described came inside the manual for Mindscape's program, MISL Soccer. Everything mentioned in the letter is true, only it applies to this incredibly complete and detailed sports simulation, rather than real life.

MISL Soccer's design is almost identical to another Mindscape program called Superstar Ice Hockey (see Software Gallery review, October 1987). Both games simulate virtually everything about the two sports, from the strategy involved in front-office personnel decisions to the action that takes place on the playing field or skating rink.

What happens on the field in MISL Soccer is a reflection of what you do off the field. The object is to try to build the strongest team possible by drafting and trading players and sending your squad to training camp.

Players are rated according to skill points, but each player's ability changes during the course of a game. After the opening kickoff, a player's actual power depends on factors like age and minutes played.

A good coach has his strongest team on the field at all times. Substitutions can be made during breaks in the action. That's also when the coach decides the type of game he wants his team to play, choosing from four basic defensive and three offensive strategies.

Most of the physical action of real indoor soccer is captured in this computer simulation. The joystick and fire-button are used to make a player move around the field and dribble, pass or shoot the ball. He can even head or bicycle kick the ball, or put on an extra burst of defensive speed.

Control over the goalie is more limited. You try to get him in front of a shot by moving the joystick, but the computer determines whether he'll leap, dive or jump at the ball. If a save is made, you can control the direction in which the goalie tosses the ball. Hold it too long, however, and a penalty is called. Official indoor soccer league penalties, along with the natural-looking movement of the players and ball, help to make the action part of MISL Soccer fun and realistic.

Another enjoyable feature of MISL Soccer is the way on-screen action responds to joystick input. Punch the fire-button or move the joystick and you'll see the corresponding action take place almost instantaneously.

One complaint, however, is that perspective isn't always as accurate as it should be. For example, the ball occasionally goes through the goalie when it looks as if he could've had it.

Also, the trajectory of a shot is determined by the position of a moving indicator bar when the shot was taken. Since the bar is at the top of the screen (and off the playing field), it's difficult to accurately aim a shot. Trying to aim the shot using the bar also has an artificial feel to it, not at all in keeping with the otherwise realistic flavor of the simulation.

It's easy, however, to forgive those flaws because MISL Soccer is an otherwise outstanding sports simulation. A nitpicker might quibble that MISL Soccer and Superstar Ice Hockey are so similar they're redundant. I'll agree that it doesn't make much sense for a Commodore owner to have both programs in his or her software library.

However, both games do a good job of conveying the feel of the sports they simulate. Since soccer and hockey are different sports, I'd have to say that that alone is justification for the existence of both games. Indoor soccer fans should be thrilled they now have a simulation of their favorite sport that is as outstanding as the one ice hockey fans have been enjoying. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$34.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

Q*BERT .... B

Now You're in for Pyramids Full of Surprises!

Data East has brought a popular coin-operated game to life in this joystick-controlled home version of Q*Bert.

The software's instructions help you move quickly into the game, and once you're underway, graphics depict colorful, lively and unusual antics. Your screen shows the front side of a pyramid—suspended in midair—with steps, or cubes, jutting out of it. This is where you direct a hopping Q*Bert—up, down or sideways. Whenever you land on a cube, it changes color; you must change all the cubes to one color during a round.

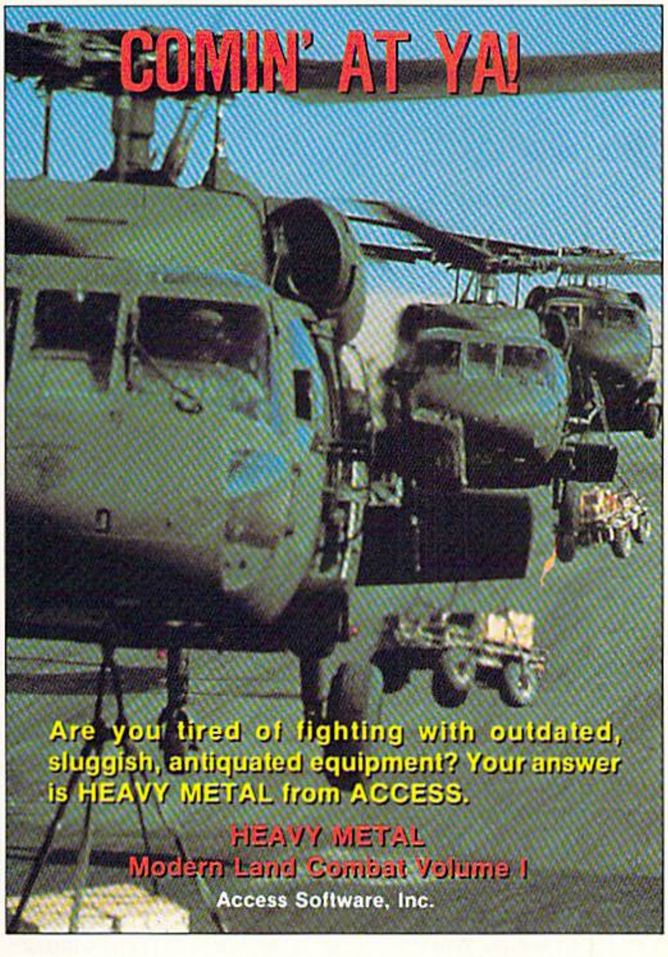
It's not easy! Bouncing balls, hatching snakes and other beasties chase you up and down the pyramid and make life miserable. One wrong step and you might hop off the side into oblivion. Invigorating sound effects help heighten the suspense.

There are nine play levels and each level consists of four rounds. You begin with Q*Bert on the topmost cube, and get two more chances to be replaced if you die. If you can hold out long enough, you'll get extra lives, but the longer you last, the more furious the action becomes.

New levels create additional surprises. In one, the pyramid changes to a diamond-shaped plane; in another, you must hop twice on cubes to achieve the desired color.

An avid Q*Bert fan since its inception, I found the disk version equipped with the same vital details as the original—from the spring-cushioned serpent, Coily, to the miracle green balls which, when stepped on, momentarily freeze all the action except for Q*Bert's.

As with the coin-op game, gravity turns upside down in the C-64 version: your enemies climb up and down the pyramid at an angle counter to common-sense perspective. The scenario resembles an optical illusion. As you occupy►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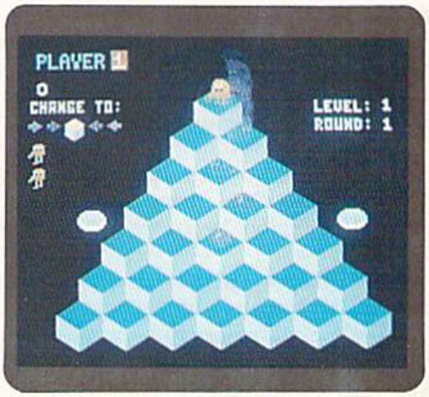


Send Q*Bert scurrying to change the colors of the pyramid's cubes.

an inverted, three-dimensional universe, you must decide which way is up.

The joystick seems sluggish now and then, but I think that's mostly psychological. It also happened to me while playing the original—you think you're hopping up, but you're really hopping right, or vice-versa. Your sense of direction gets skewed. To counteract this, don't think about what you're doing—just hop!

Q*Bert offers a style of movement that's compelling to arcade players. The frumpish, orange-skinned star hardly resembles Fred Astaire, but it certainly pays to be nimble-footed! The game's imagination and complexity should appeal to all ages. *(Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/$9.95.)*

—JOHN DIPRETE
CRANSTON, RI

KID NIKI .... B

A Ninja Game To Test Your "Radical Badness"

First there was The Revenge of the Beefsteak Tomatoes. Then came Worm War I and The Communist Mutants from Space. Now Data East has translated one of its arcade programs into a C-64 version: Kid Niki, Radical Ninja is the latest entry in the "electronic-games-with-strange-titles" category.

The scenario, which is as bizarre as the name, blends medieval chivalry and punk rock, with a bit of Japanese folklore thrown in. According to the software's documentation, Kid Niki is "a 'rad' and 'bad' punk dude," whose spike-haired girlfriend, Princess Margo, has been kidnapped by the Stone Wizard. To rescue her, Niki must hack his way through seven levels of play with a Spinning Sword from the School of Chirin. The foes he must defeat include Death Breath, the Grody Blue Grub and a Samurai Guard.

When brought to the screen, these diverse elements become a creatively crafted fantasy quest. Using either a joystick or the keyboard, you guide Niki on his journey through a series of scrolling screens. This "dude" can jump and run to the left or right, with the sword as his only offensive weapon.

The graphics are lush, detailed and colorful, and serve to enhance the action. With their accompanying sound effects, they are Kid Niki's most impressive feature.

The skill level that the contest demands varies from scene to scene. While most are easy, some screens manage to test the mettle of an arcade ace.

Unfortunately, inadequate documentation can make certain of these dangerous situations—like clashes with Big Bosses—still more difficult. In these encounters, which take place at the end of each level, the only indication that Niki has scored a hit seems to be the flight of his sword through the air. However, the instruction pamphlet fails to mention this; in fact, it appears to indicate that the sword has no function at all in Big Boss battles.

This is the only significant flaw that I found in Kid Niki. If a potential buyer is aware of this problem, is able to meet a challenge with varying levels of difficulty and is broad-minded enough to accept, or at least to tolerate, the game's weird scenario, he or she will enjoy a computerized journey through lands rich with fantastic characters and sights. *(Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/$29.95.)*

—WALT LATOCHA
OAK PARK, IL

STEVE GARVEY VS. JOSE CANSECO IN GRAND SLAM BASEBALL .... C–

Something Old, Something New...

If you own a Commodore, you can find just about any kind of computer baseball simulation you want—action, strategy or combinations of the two.

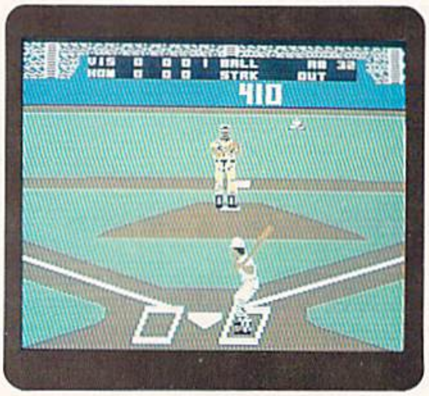
Cosmi's Steve Garvey vs. Jose Canseco in Grand Slam Baseball is a mouthful-named computer program that takes the baseball-simulation craze to extremes. Not only does it attempt to simulate baseball, it tries to simulate a sport that doesn't even exist.

After examining Grand Slam Baseball, I can now say I've had my fill of baseball simulations. Quite frankly, it would take a pretty spectacular program to excite me, and Cosmi's effort doesn't fit the bill.

Grand Slam Baseball is a program with mediocre graphics, sometimes sloppy animation and limited options, the only interesting one of which is a type of baseball game played with modified rules. The object of that game is to load the bases and hit homers, preferably grand slams.

Instead of scoring runs, players score points based on the number of bases advanced and home runs hit. Points are deducted whenever a runner scores on any hit other than a home run, grand slam or otherwise.

Every time the bases are loaded, the statistical equivalent of Oakland Athletics star Jose Canseco or San Diego's Steve Garvey automatically steps to the plate.



Will you need to call in the pros in Cosmi's Grand Slam Baseball?

The cleanup hitters in the Grand Slam variation are allowed seven strikes. It takes eight balls to walk Canseco or Garvey with the bases loaded. Such a walk is worth 100 points, and the slugger gets to hit again.

Under the circumstances, it's impossible to tell how closely the computerized Canseco and Garvey emulate the performances of the real players. The only definite correlation between these players and the game is the program's title and the brief biography of each that's enclosed with the software.

That doesn't bother me as much as the mediocre performance of the game itself. The first noticeable annoyance is a load time that runs on into minutes, rather than seconds.

Once you make the choices so typical of this genre—opting to play against the computer or a friend, and then modifying or sticking with a suggested lineup of fictitious players—the game begins with a view from slightly above and behind home plate.

The figures of the pitcher and batters are fairly well drawn, but the field perspective is distorted. The pitcher's mound is oddly shaped and too close to home plate. The center field wall also looks much too close.

Things get worse once a batter makes contact and the view changes to show the area of the field to which the ball was hit. Fielders move erratically as they chase batted balls. Instead of the on-screen figures slowly getting smaller as they move away from home plate, they're large one second and tiny the next.

That kind of distortion occasionally makes it difficult to field a batted ball cleanly. It's sometimes hard to tell, for example, when a player has actually retrieved the ball.

It's really a shame that the graphics and animation aren't better, because Grand Slam Baseball actually has one of the most logical and easy-to-learn control systems of any action-type computer baseball simulation I've tried.

Because of the logical design, joystick control is somewhat intuitive. For example, after your shortstop fields the ball, you can make him throw it to home plate by pulling the joystick straight down—the position corresponding to the catcher—and pressing the fire-button.

To Grand Slam Baseball's credit, response to all joystick input is generally quick and accurate. On the other hand, the mediocre graphics and animation often make it difficult for you to tell whether it's the ball or the runner that reached the base first.

That kind of performance from a computer baseball simulation would, of course, cause any self-respecting baseball fan to cry "foul ball!" Then again, there are probably very few serious Commodore-owning baseball fans who haven't already chosen a baseball simulation from the many that are already on the market. *(Cosmi, 415 N. Figueroa St., Wilmington, CA 90744. C-64/$24.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

SKYFOX II .... A

Air Combat Taken to the Limit!

For some of you, it's been nearly four years since you took to the sky in the original Skyfox fighter. Now that Electronic Arts has released Skyfox II: The Cygnus Conflict, you have a chance to move up the ranks from Skyfox Sky Pilot to Federation Warpwarrior. In your new role, you can help suppress a Xenomorph uprising against the Federation.

You can choose from among ten new missions, ranging from simple escort, seek and destroy to war with the Xenomorphs. Each mission can be flown as a cadet, wingman, flight leader, squadron commander or ace of the base. The higher your rank, the more formidable your opponents are in battle.

The big attraction here isn't the wide variety of missions, however. It's the detailed, high-speed animation. From the title screen to the moment that last Xenomorph fighter disintegrates in a tumbling ball of flame, Skyfox II is a feast for the eyes. Unlike the slow-moving, framed outlines of enemy ships you get to shoot at with some space games, the Xenomorph fighters you'll face in Skyfox II are solid, fully detailed, and able to dart evasively through the star-filled sky with speed and agility. Each time you get one in your sights and score a hit with your neutron disruptors, a small burst of flame flashes out from the point of impact. Cause enough damage and you'll see the enemy tumble into a fatal roll before disappearing in a fiery explosion.

The floating asteroids that form Asteroid Alley, a dangerous stretch of space separating Federation Star Guard from Xenomorph Sovereign, are also impressive. While crossing the alley at high speeds, the irregularly shaped asteroids zoom by your cockpit with incredible speed and occasionally strike the window with tremendous force.►

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Modern Land Combat Volume I
Access Software, Inc.

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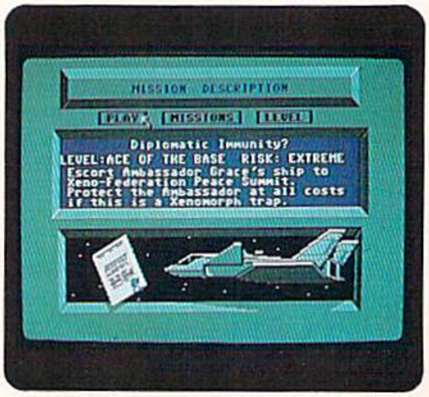


Diplomatic Immunity?
LEVEL:ACE OF THE BASE RISK: EXTREME
Escort Ambassador Grace's ship to
Xeno-Federation Peace Summit.
Protect the Ambassador at all costs
if this is a Xenomorph trap.

In one mission, as ace of the base, you must use your Skyfox fighter as an escort jet.

However, if you come to a stop in the middle of the alley, you can watch as the huge hunks of space debris float harmlessly by the Skyfox.

Besides neutron disruptors, the Skyfox II is equipped with guided photon pulse bombs and anti-matter mines. In addition to these offensive weapons, the Skyfox comes with a deceptor device that can be used to conceal the ship from enemy radar, and protective shields designed to absorb much of the damage from enemy fire and stray asteroids. Perhaps the best feature of the current model, however, is the new targeting system that automatically locks on to the nearest enemy ship and then shows you the proper direction to move your joystick and find your target.

During the course of each mission, you can refuel the Skyfox and make any necessary repairs by docking at a friendly starbase. Before being given clearance to dock, however, you're required to enter the first four letters of the starbase's name. The names of all starbases are included on the Cygnus Constellation Map that's provided in the game package.

The only minor complaint I have with Skyfox II is that the map's combination of dark print on dark paper makes it difficult to read. But, any eye-strain you get from reading the map is a small price to pay for the spectacular images you'll see on the screen. *(Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95.)*

—Bob Guerra
South Boston, MA

Tetris .... B

The West Takes On a Russian Rubik's Cube

Two researchers at Moscow's Academy Soft computer center have come up with Tetris, a different sort of game based on the problem of fitting variously shaped objects into the least amount of space. Sound too easy? Well, Spectrum Holobyte ups the stakes by marketing the game in a red box with Russian lettering and the subtitle, The Soviet Challenge!

So how does this bit of Russian razzle-dazzle work? Well, "tetra" implies having four parts, and Tetris shapes are four-piece figures, each composed of text-character size squares joined on at least one side. For instance, you encounter left- and right-oriented "L," "I" and "T" shapes, 2 × 2 squares, and so on. Your goal is to place as many of these objects as possible in a pit, seen from a side view, that's ten units wide and 20 units deep.

A game starts when the first randomly generated shape appears and begins to drift down into the empty pit. You control left-right movement and rotation (clockwise or counter-clockwise) and can force an instant drop. Except for a Pause option, you can't slow the object. Once a piece hits bottom, or lands on other pieces, it locks into place and the next one begins to drop. The quicker a piece is placed, the more points are scored. Whenever one or more ten-square rows is formed, all the squares in the row disappear, anything above moves down, the Rows Eliminated counter increases, and your score takes a nice jump! As long as you can maneuver falling objects to form complete rows, there's room in the pit for more pieces and more play.

The levels of difficulty run from zero to nine. Wherever you begin play, an automatic level boost for every ten rows removed continues to increase game speed. Thus, while you can usually afford to loaf a bit at level 0's leisurely ten-second (top-to-bottom) drop time, things start to get rough around level 4 and positively insane at level 9's two-second pace. A game ends once the stack reaches the top of the pit and blocks new entries. Moderately skilled players can count on plenty of action before piling out; yet, even with the "next piece" display to help planning, a contest seldom runs more than ten minutes.

One notable weakness of the game includes a failure to maintain the Top Ten scores on disk. Also, somewhat glitchy stick response (poor "de-bouncing") results in occasional unwanted instant drops. Fortunately, the latter affects play at only the upper three or four levels.

Featuring instant restart, an excellent musical score and attractive display, Tetris is, as Spectrum Holobyte claims, remarkably addictive. As in jig-saw puzzles, there's something enjoyable about "fitting stuff together" and a curious feeling that useful learning might be a by-product.

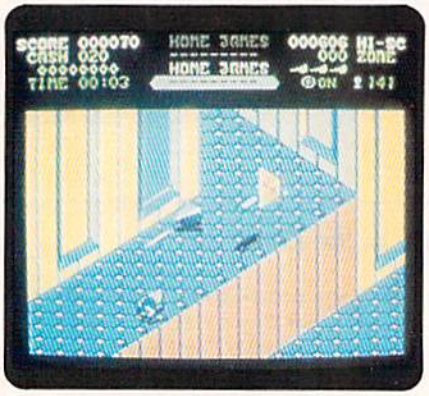
Tough? Konetchno! (Of course!); but long-lasting fun as well. Tetris is one Russian challenge worth taking on. *(Spectrum Holobyte, 2061 Challenger Drive, Alameda, CA 94501. C-64/$24.95.)*

—Jeff Hurlburt
Houston, TX

Zig-Zag .... B+

Welcome to a New Dimension in Arcade Games

In 1983, Zaxxon amazed arcade patrons with its innovative three-dimensional graphics. Although Zig-Zag shares many similarities with Zaxxon, this new piece of software



Zig-Zag features three-dimensional graphics and a multitude of mazes.

is so visually advanced that it leaves its classic predecessor looking as sophisticated as Pong.

Zig-Zag's goal is to guide a continuously moving star fighter to eight crystals that are hidden within a 1400-screen maze. The program offers both normal and reverse joystick control. For experienced players, there is a Brain Teaser mode, in which walls and other objects pop in and out of existence whenever a ship hits a target in its path.

A spacecraft can leave one of the labyrinth's corridors only by running into a deflecting prism on the floor or a wall; otherwise, the fighter will just bounce from one end of the passageway to the other. Complicating the craft's maneuvers are attacks by seven types of aliens—the game ends when they shoot down the player's last ship. A craft is also destroyed when it enters one of the Death Zones that are scattered among the screens.

A second type of special area contains rewards for ships that have earned money by killing aliens. After landing in a Shop Zone, a player can spend this cash purchasing X-ray vision, maps, extra ships, "smart" bombs, temporary shields and other items. Determining the proper use of these articles in the quest for the crystals provides much of the game's mental challenge.

An extremely addictive background theme typifies Zig-Zag's excellent sound effects, and even they are surpassed in quality by graphics that equal anything generated by a C-64. Every scene is rich in details that are painted with vivid and continually changing colors. Also, certain maze walls add to the game's three-dimensional perspective by fading from view when a fighter passes near them. That feat, along with the complex combat maneuvers of the ship and the aliens, forms a magnificent display of animation.

The game does have some problems: it normally takes about four minutes to load from disk. However, some software accelerators can cut that time by as much as two-thirds.

A more serious difficulty is a sketchy instruction pamphlet, which is misleading in its treatment of saving crystals from one game to another. The booklet doesn't clearly describe this feature, nor does it explain that saves can only be made in the Brain Teaser mode after the last fighter has been destroyed and after all of the software's credits have appeared on the screen.

Nonetheless, most experienced gamers will love Zig-Zag. Either its intriguing play options or sensory effects would justify its purchase. Having both in one package means that Zig-Zag is a must-buy program for many C-64 owners. *(Spectrum HoloByte, 2061 Challenger Drive, Alameda, CA 94501. C-64/$24.95.)*

—WALT LATOCHA
OAK PARK, IL

SPEED BUGGY .... B+

Driving Was Never Like This!

Okay, I'll admit it. I haven't been in a video arcade in months. Like most Commodore owners, the majority of my game playing is done at home on my computer, so I don't have a good idea of what's popular in the arcades.

Data East, one of the leading manufacturers of arcade video games, must know though, because they keep coming out with home computer versions of "arcade hits."

Speed Buggy is Data East's latest translation. Like other Data East releases I've reviewed, it's easy to learn and quickly responsive, features good graphics and is quite addictive.

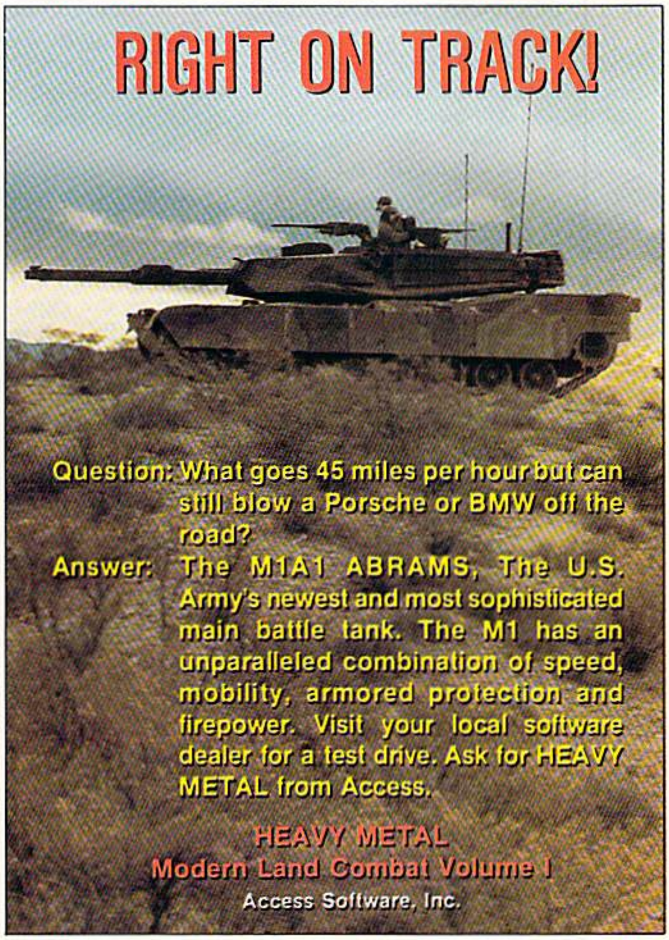
Most of all, it's fun. Driving simulations that put you behind the wheel of some kind of racing vehicle are nothing new, but Speed Buggy has a couple of new wrinkles that prevent it from seeming like just another rehash of an old idea.

Like most games of this kind, the object is to complete a particular racing course within the allotted time. Speed Buggy has five different courses of varying difficulty from which to choose, and depending on the course, you must complete either an entire circuit or one leg of the course.

Your perspective is from slightly above and behind the vehicle you're driving. No matter how you move the joystick, response is excellent. This is extremely important in a game like Speed Buggy where sloppy control response can be very aggravating. Strange as it may sound to those unfamiliar with racing games, it's satisfying to know that if you wreck in Speed Buggy, it's your fault and not the program's.

Speed Buggy is one of the better racing games in both graphics and animation. The car and other on-screen objects, like trees and flags, are well drawn, and you get a real feeling of movement as your vehicle races down the road. Perspective is also outstanding, with objects smoothly and gradually getting bigger as your buggy approaches them.

One of the new features Data East has added to make this genre more enjoyable is the type of vehicle that's being raced. It's a dune buggy, which means it's capable of doing some things the typical computer racer just can't do. For example, ►


RIGHT ON TRACK!

Question: What goes 45 miles per hour but can still blow a Porsche or BMW off the road?

Answer: The M1A1 ABRAMS, The U.S. Army's newest and most sophisticated main battle tank. The M1 has an unparalleled combination of speed, mobility, armored protection and firepower. Visit your local software dealer for a test drive. Ask for HEAVY METAL from Access.

HEAVY METAL
Modern Land Combat Volume I
Access Software, Inc.

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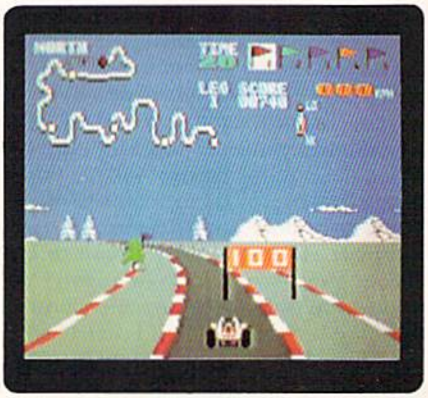


You can gain bonus points by driving through some gates in Speed Buggy.

it bounces over certain obstacles instead of just crashing into them. Also, with a little finesse, it can be driven tilted up on two wheels. This technique lets you maneuver around otherwise unpassable obstacles.

It's great fun making this strange-looking little car bounce around the track on its fat, overinflated tires. The outstanding graphics make it a pleasure to sit back and watch as the car bounds over logs and slips past boulders that clutter the off-road courses.

Boulders aren't the only things you must avoid—fences, walls and even waterways regularly pop up in front of you on the course. Try jumping over some of these obstacles by driving your dune buggy full speed and launching your vehicle into the air.

Sometimes, though, you'll be trying to hit things on the track. Throughout each course, there are colored flags and gates that are worth bonus points or extra running time if you knock over or drive through them. You can measure your skill by the number of points accumulated or the distance covered on a given course.

I have only two complaints with Speed Buggy. Scores cannot be recorded permanently to disk, and once you run out of time on a given course, you must start back at the beginning if you want to try it again.

But these complaints are minor compared to the enjoyment of playing Speed Buggy. I don't know how it fared in the arcades, but if the home version is any indication, I have no reason to believe it wasn't the hit Data East says it was. *(Data East USA, Inc., 470 Needles Drive, San Jose, CA 95112. C-64/$29.95.)*

—SCOTT WASSER
WILKES-BARRE, PA

PRINTPOWER .... B

Flexible and Inexpensive—Are We Talking About Software?

PrintPower is a versatile graphics program that has the ability to design and print three different styles of cards, signs and stationery, as well as banners up to 42 pages long. The main program disk and one graphics library disk are packaged in this program, and you are encouraged to make backups of your original disks.

PrintPower has worked fine with both my Epyx FastLoad and my Access Mach 5 cartridge, but the program has its own impressive, and almost as speedy, fast-loader, which you can disable if it conflicts with your computer setup.

The manual is clearly written and illustrated. A step-by-step tutorial takes you through the process of making a greeting card. There's also a reference sheet that summarizes the important key commands and printer requirements and an invaluable printout of the sketches on the graphics disk.

The library disk contains 60 assorted graphics, 40 borders, six fonts, 11 banner type sizes and seven different special effects. You can build up quite a number of designs by changing the sizes of all the options, and text can be overlapped with graphics.

The program is menu-driven and supports over 30 printers, all of which are conveniently listed on the outside of the box. The printer setup is easy to follow and save to disk.

A printer driver is also supplied. It lets you modify the printer files, but it is a bit cryptic. Unless you really know the ins and outs of your particular printer, I wouldn't recommend it. Unfortunately, your system could lock up if you choose the wrong printer file, and you'd have to start again.

On the positive side, there are four printer files—squareness, line feeds and so forth—that you can test. You can even adjust the memory usage of your computer.

Once your printer is ready, the main menu takes you to the split screen where your designing is performed. The bottom of the screen is your work area, and the top is a template where your creation is represented as blocks within a rectangular area. There is a help screen available in the work area, in case you forget what something represents on the screen.

There is no Preview mode, but if you don't like how the printout is shaping up, you can stop to edit at any time. Your final product—the last creation you worked on—is automatically saved to disk, so you can go back at a later time to edit further or to print.

Hi-Tech Expressions has made PrintPower directly compatible with another of their programs, AwardWare. The graphics supplied with PrintPower are a particularly good mix—everything from an amusing penguin on a skateboard to the traditional birthday cake—and all are well drawn and imaginative.

There are hints in the manual to help make your finished products look original and fancy. I found this program easy to use and capable of producing very good printouts. A nice piece of work from Hi Tech. *(Hi-Tech Expressions, 1700 NW 65th Ave., Suite 9, Plantation, FL 33313. C-64/$14.95.)*

—EDITH CHASEN
WOODHAVEN, NY

CARD SHARKS .... A+

Pull Up a Chair, Name Your Game And Deal 'Em Out!

Forget nuclear warheads. Forget intercontinental missiles. When the chips are down, could Ronald Reagan beat Soviet leader Mikhail Gorbachev in a game of Hearts?

Based on Accolade's Card Sharks program, I'd say no. Judging from an evening I spent at the Hearts table with those two opponents, it appears ol' Gorby has something up his sleeve. However, British Prime Minister Margaret Thatcher ended up winning the game.

If sitting around the game table playing Hearts with the computer likenesses of world leaders doesn't appeal to you, this disk provides a choice of three other opponents—

Luigi, Lady and Milton—for two other games—Blackjack or Poker.

Card Sharks' graphics are excellent. The action centers on a green felt gaming table, and your opponents sit facing you. When dealing, players sail cards across the table. During the games, players' remarks appear in cartoon-like bubbles, and what comments they are!

Players' expressions are constantly changing during the game. Reagan is all smiles when he thinks he's holding the best hand.

There are three versions of poker: Five Card Draw, Seven Card Stud and Texas Hold 'Em. The games proceed at a slow pace for the sake of beginners who don't know the rules; pressing run/stop speeds them up. The 13-page instruction booklet has a detailed set of rules for all the games.

In Hearts, you're given the option of playing to score points up to a total of 100, 200, 400 or 800. Playing is almost like sitting around the dining room table with friends. At the start of the hand, you'll pass three cards left, right or across the table, or hold all the cards you were dealt.

Blackjack carries a minimum bet of five dollars and a maximum of $200, with intermediate bets of $10, $15, $25, $50, $75 and $100. Doubling down (doubling the bet if the first two cards total 10 or 11 and neither is an ace) is allowed. If the first two cards are alike, the hands can be split, provided you have funds to cover the wager on the second hand.

Previous card game simulations either had fair graphics and strong card play, or strong card play with nearly nonexistent graphics. Card Sharks blends great graphics and great card play. After an evening of playing poker with Ronnie, you'll probably never want to go back to the Las Vegas-style poker machines again. *(Accolade, Inc., 550 S. Winchester Blvd., San Jose, CA 95128. C-64/$29.95.)*

—LONNIE BROWN
LAKELAND, FL

WORDPRO 128 WITH FILEPRO 128 ..... A

These Two Should Fulfill All Your Word Processing and Database Needs

There are two reasons why WordPro, the grande dame of Commodore word processors, continues to merit accolades—performance and value. Originally written for the Commodore PET, succeeding versions of WordPro have consistently ranked among the top word processing packages for CBM's 8-bit machines.

A full-featured program with extensive formatting capabilities, WordPro 128 has been repackaged with a companion database, FilePro 128, and distributed as part of Spinnaker's Better Working series.

WordPro 128 is a word processor for the frequent writer. Formatting commands embedded along with the text control the appearance of your printed document, and no document is too large for it. WordPro 128 reserves 39K of RAM for a text area that holds up to 500 lines (40,000 characters)—that's almost 25 double-spaced pages. Documents of virtually unlimited length are created by chaining, a feature that automatically loads the next disk file during printing and certain editing functions. Two text areas let you work on different documents at the same time.

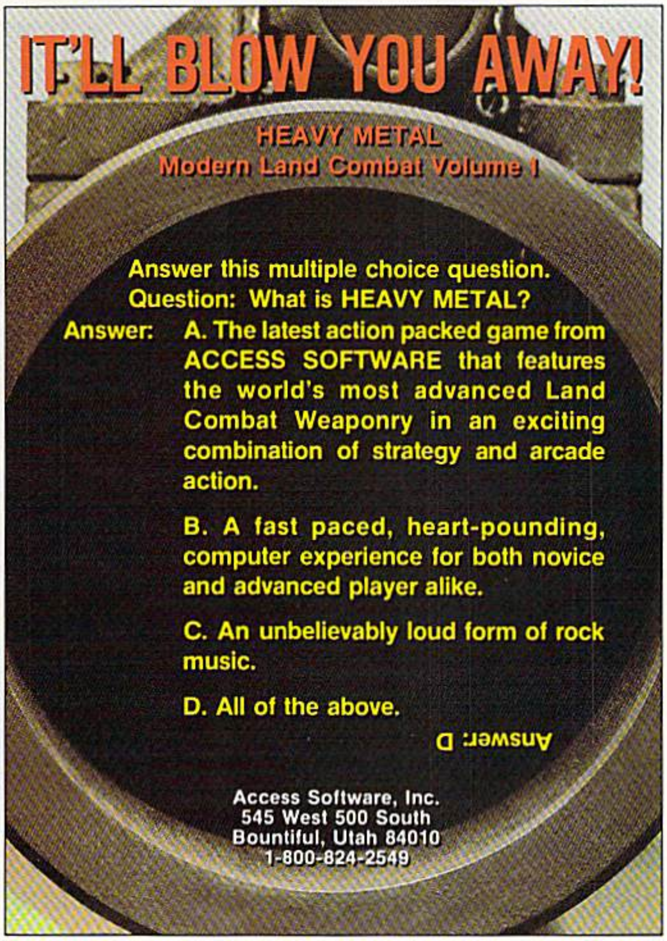
You'll learn to appreciate WordPro 128's ability to search and replace several different words with a single pass. The program employs graphic tabs to line up columns when your printer is set for proportional spacing. It also allows relative assignments of margin, header and footer settings. This lets you enter format changes relative to current settings (plus or minus) without being concerned about actual numeric values.

The spelling checker, one of the fastest I've seen, runs without your having to exit the word processor. You can expand the 90,000-word dictionary on the flip side of the program disk to include technical terms, proper nouns and other special words. I only wish that the spell checker would ignore repetitions of a newly learned word.

WordPro 128 also supports page referencing, a feature that uses a special command embedded next to as many as 300 key words. This lets the program automatically create an index or table of contents.

An assortment of printer modules supports a wide variety of printers, including some that are capable of proportional spacing. They eliminate the frustration of researching printer control codes and the aggravation of customizing the software to your specific printer.

If you've ever decided to change a word or sentence after you've printed what was to be the final draft of your manuscript, you'll really appreciate the ability to start printing from any page instead of starting over at page one. ►



Answer this multiple choice question.
Question: What is HEAVY METAL?

Answer: A. The latest action packed game from ACCESS SOFTWARE that features the world's most advanced Land Combat Weaponry in an exciting combination of strategy and arcade action.

B. A fast paced, heart-pounding, computer experience for both novice and advanced player alike.

C. An unbelievably loud form of rock music.

D. All of the above.

Answer: D

Access Software, Inc.
545 West 500 South
Bountiful, Utah 84010
1-800-824-2549

Circle 7 on Reader Service card.

The companion database, FilePro 128, adds a relatively painless method of maintaining address lists or other data that can be integrated into form letters. While individual records can contain as many as 20 different fields, total record length cannot exceed 254 characters. Too small for many applications, this limited capacity is just right for mailing lists, inventory labels and descriptive price tags.

It is harder to evaluate the potential of this program when it comes to overall data storage capability. Spinnaker promotes FilePro 128 as being capable of handling up to 4000 records per file. Unfortunately, this is only true if you use a hard disk or an ancient CBM 8250 dual drive on the IEEE bus. Because FilePro 128 uses relative files, a double-sided disk in a 1571 drive only holds 725 blocks of data.

The simple test file I created had room for 1295 records. This figure is a bit deceptive, however, because names and addresses to be merged into form letters must first be loaded into the extra text area of the word processor. Since FilePro 128 uses carriage returns as delimiters when writing lists to disk, each address occupies several lines. This means that fewer than 70 addresses can be held in memory at once. Large mailing lists created with FilePro 128 won't fit into the companion program. You'll either have to find a way to break them up or change the carriage returns.

Since FilePro 128 also has the ability to send data directly to the printer, this entire problem can be avoided by using the program's tiny text editor to create your form letter. Eliminating the intermediate steps of creating a sequential output file and loading it into WordPro 128 lets FilePro 128 access the entire database as it prints. Unfortunately, the database's formatting and printer control capabilities are modest compared to the word processor's.

In spite of these limitations, FilePro 128 is still an extremely serviceable program with several excellent features. I was particularly grateful for the batch processing system, which stores up to 127 new records in memory before writing them to disk. Data entry goes twice as fast when you don't have to wait for the disk drive before beginning another record. Default strings can be pre-written to individual fields, saving considerable typing if the majority of the addresses are in the same city or state.

I have only two bona fide complaints. The program crashes if you hit the output key before turning on the printer, and the output disk drive defaults to device 9, drive 1. The first is a bug, which should be swatted by better error trapping. The second is an annoyance that is needlessly imposed upon new users.

While staunch WordPro 128 devotees might be disappointed that there haven't been any discernable additions or improvements to the program since it was upgraded two years ago, anyone who doesn't own a copy of this first-rate word processor should be overjoyed. This pair of programs would be a bargain at twice the price. *(Spinnaker Software, One Kendall Square, Cambridge, MA 02139. C-128/$39.95.)*

—John Premack
Lexington, MA ■

MICROSOFT
Flight Simulator II

PART 3

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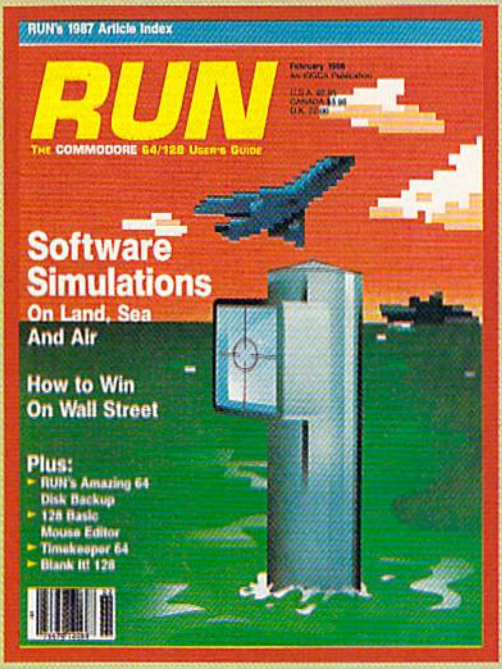

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• Action Replay allows you to Freeze the action of any memory Resident Program and make a complete back-up to disk or tape — but thats not all . . . . Just compare these features

☐ Simple Operation: Just press the button at any point and make a complete back-up of any* memory resident program to tape or disk.

☐ Turbo Reload: All back-ups reload completely independantly of the cartridge at Turbo speed.

☐ Sprite Monitor: View the Sprite set from the frozen program — save the Sprite — transfer Sprites from one game to another. Wipe out Sprites, view the animation on screen. Create custom programs.

☐ Sprite Killer: Effective on most programs — make yourself invincible. Disable Sprite/Sprite/Backround collisions.

☐ Unique Picture Save: Freeze and save any Hires Screen to tape or disk. Saved in Koala, Blazing Paddles Format.

UNIQUE FEATURES:

☐ WARP 25

Loads 50K in under 5 seconds!!

Yes it true action replay features "Warp 25" the world's fastest disk serial Turbo. A typical backup will reload in under 5 seconds.

● No additional hardware required ● No special formats ● Super reliable ● Remember this is not a system where files have to be converted — with action replay you simply save directly into Warp 25 status — reload in seconds. ● Backup all your existing programs to load at unbelievable speed!! ● Because AR4 has on board ram it can also load commercial disks directly at 25 times speed.

This is unique to Action Replay!!

● Warp Save/Load Available straight from Basic.

☐ Plus unique Code Cracker Monitor

● Freeze any program and enter a full machine code monitor
● Full Monitor Features — Dissasemble, Hex, Find, Jump, Compare, Replace, Two Way Scroll, Full Disk Load/Save, Printer Support etc. In fact all usual monitor commands plus a few others.
● Because of Action Replay's on Board Ram the Frozen program can be looked at in it's ENTIRETY. — In it's Frozen state. That means Video Ram, Zero Page etc. and remember you see the code in it's Frozen state not in a Reset state as with competitors products. ● Restart the program at any point.
● No corruption ● An absolute must for the program Hacker — make changes and see your result's instantly!

PLUS SUPPORT UTILITIES

☐ Action Replay Graphics Support Disk

To help take advantage of action replay's unique power to freeze any screen and save it into your favourite graphics package we have prepared a suite of graphic support facilities.

● **Screen Viewer** View screens in a 'slide show' sequence — Joystick control simple to use. ● **Message Maker** Add scrolling messages to your saved screens with music, very easy to use. ● **Prosprite** A full sprite editor, modify/save/load feature, full edit facilities. ● **Zoom Lens** Explode sections of any saved screen to full size including Border — Superb fun and very useful.

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☐ Action Replay Parameter Support Disk

Action Replay can backup any memory resident program plus the majority of multiloading disks. To further enhance your ability to backup the small number of tricky programs we have a number of useful utilities and tips to help, these include a disk nibbler, track sector editor, special file copier, plus a number of others. A must for the dedicated cracker.

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☐ Utility Commands: A host of additional commands: — Autonum, Append, Old, Delete, Linesave, Printorlister

☐ Screen Dump: Print out any Screen to Host or Printers. 16 Gray Scales, Double size print options.

☐ Unstoppable Reset: Reset button to Rectrieve System and Reset even so called Unstoppable Programs

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☐ Compatible: With Fast DOS and Turbo Rom Systems

☐ Disk Utilities: Fast Format, Directory, List, Run and many other key commands are operated by Function Keys

☐ Unique Restart: Remember all of these utilities are available at one time from an integrated operating system. A running program can be Frozen to enter any Utility and the program is restarted at the touch of a key — without corruption

LSI Logic Processor: This is where Action Replay IV gets it's power. A special custom LSI chip designed to process the logic necessary for this unmatched Freeze/Restart power. No other cartridge has this power!

---

* In our most recent test we were unable to find any program that AR4 could not cope with.

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☐ No need to have loads of cartridges — just make a selection from the Superom menu.

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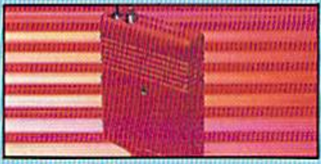

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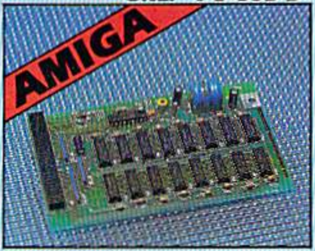

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ILLUSTRATED BY DOUG SMITH

Islands

Build a powerful Caribbean island empire while inciting unrest and revolution in your opponent's land.

The story goes that, on the orders of King George III, two aristocratic brothers left London in the spring of 1799 and set sail for the Leeward Islands in the West Indies. The king was determined to turn the newly appropriated islands of Key Antigua and St. Christopher into profitable colonies, and the brothers, as governors, were given five years in which to do the job.

They arrived in the West Indies in early January of the following year and, each assuming control over one island, set about the task at hand. To all accounts, those early years were tough, with famine, hurricanes and rebel uprisings constantly threatening disaster.

Whether or not the governors met the king's expectations remains unclear, because records are fragmented. However, today the islands of Key Antigua and St. Christopher are thriving members of the British Commonwealth.

Welcome to Islands, an educational strategy game that puts you in the shoes of one of the governors, charged with building your island into a viable economic and military entity. This may be accomplished through treachery against the other island or honest hard work in nourishing your resources. Though Islands is meant to be played by two, you can also enjoy striving for a high score alone.

Starting to Build

Type in the following boot program:

```
10 IF A=0 THEN A=1 : LOAD"+ISLE ML  ",8,1
20 SYS 32768
```

Then type in Listing 1 and run it to create a machine language file on disk. Finally, run the above program to boot the machine language file.

After the title screen appears, press any key to start the game. Player 1 controls Key Antigua, the northern island, with a joystick plugged into port 2; player 2 governs St. Christopher, to the south, with the joystick in port 1.

Following the title screen, a map appears, and time starts ticking away. Now it's ►

By JOHN RYAN

time to begin purchasing food, houses and factories by activating the appropriate icons under your Active label on the right side of the screen. You toggle these icons on and off by moving the cursor against any screen border. Your score and information about your island's population and gold stores also appear on the right side of the screen, while a line at the bottom of the screen tells how many houses (H), crops (A) and defenses (D) you own at the beginning of each month.

To make a purchase, use the cursor to place the selected icon on the desired location and press the fire-button. If you have enough gold, the icon will be transferred to the island; if not, nothing will happen. Except for boats and troops, icons may be placed only on your own island. Boats, of course, go in the water, and you can place troops only on your opponent's island.

Carefully selected investments will build your simple island into a powerful nation. Your subjects must be fed and housed or productivity will go down and unrest may occur, and factories must be built to produce income.

The Icons

Crops, which are represented by green icons, cost five gold pieces (GPs) each, and a planting feeds 400 people. Financially, a crop is worth two gold pieces per month, plus ten GPs for each second of rain it receives. When you hear the rain falling, watch the gold grow!

At the end of each month, a portion of the crop is harvested, and then you can replant or cover the farmland with housing or factories. In deciding whether to plant or build, remember that the population of your island may be growing, and empty bellies cause unrest and hostility.

When island morale is low, revolutionary rebels (represented by shield and spear icons) rise up and often destroy factories and forts. Sometimes they're not visible, either; if you hear an explosion, and one of your factories or forts disappears, it's a good guess an unnamed rebel group was responsible. Once established on an island, rebels are only eliminated by attrition.

Houses cost 50 gold pieces and accommodate 500 people each. Morale and productivity will decline if your people get rained on, so don't let construction fall behind!

Factories cost 35 gold pieces each and generate a basic ten gold pieces per month. However, this amount is adjusted to reflect morale, and hence productivity. If you overwork your laborers by establishing too many factories, their yield could plummet to zero. While factories produce income, they also increase an island's mortality rate through worker deaths.

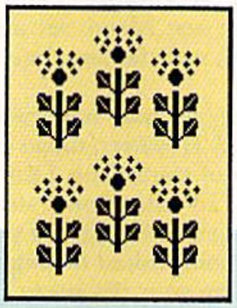
Mines cost 100 gold pieces and generate 15–25 gold pieces per month, adjusted to morale and productivity. They, too, cause health-related deaths.

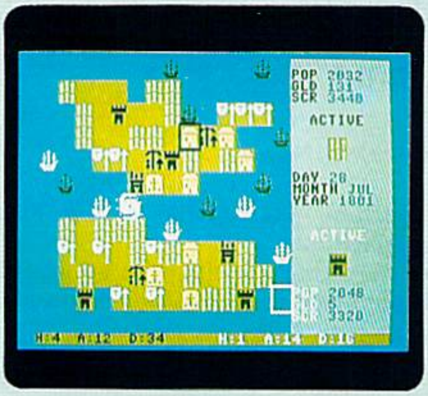
Hospitals, which cost 75 gold pieces, increase an island's productivity, add 10 percent to the monthly birth rate and add bonus points to your score.

Boats, at a cost of 25 gold pieces, serve as both income producers and warships. Each one generates five gold pieces per month in income, and a boat in Movement mode can contribute fishing income as well. When a boat that's fishing passes under a raincloud, its income increases, because the schools feed more in warm tropical rains. Listen to the coins drop into your coffer as the rain falls on the ocean!

Be careful, though; overfishing—resulting in no gold for either player—will result if both your boat and that of your opponent occupy the same area. Only those boats in Movement mode may fish, and each one can feed 100 people.

Listen to the coins drop into your coffer as the rain falls on the ocean!





You need a balance of factories, fishing, farming and troops for defense in building a successful island economy.

Table 1. Quick Reference Chart.

Icon	Cost	Income	Affects. . .
Crops	5	2*	Welfare
Boats	25	5*	Welfare, Defense (2 points)
Factories	35	10	
Houses	50		Morale
Forts	60		Defense (10 points)**
Hospitals	75		Welfare, Morale
Mines	100	15–25	
Troops	150		Welfare, Morale, Defense***

* Additional income can accrue from rain or fishing.
** Forts protect all adjacent communities, industries and boats.
*** Destroy properties, thereby affecting these attributes.

P = Pause the game

Boats also add two points apiece to an island's defenses and may be used in naval warfare. You can sink enemy boats if they aren't in Movement mode and you have more defense points than your opponent. To sink a boat, put your warship into Movement mode, move on top of the opposing boat and exit Movement mode. (See discussion of Forts, below, for an exception to this.)

To purchase a boat, select the appropriate icon, place the cursor over open water and press the fire-button. To shift a boat into Movement mode, activate the boat icon, place the cursor over the boat and press the fire-button. To exit Movement mode, press the fire-button a second time. The active icon may not be changed when a boat is in Movement mode.

Forts cost 60 gold pieces and add ten defense points to an island. These points are useful in naval warfare, as well as in combatting both rebels and invading enemy troops. Forts protect all adjacent crops, houses, hospitals, factories and gold mines from attack by hostile forces. Likewise, boats anchored next to a fort cannot be sunk by your opponent's boats.

Invasion troops employed to attack your opponent cost 150 gold pieces each. To deploy your troops to destroy your opponent's industrial or housing projects, just place your cursor over the target and press the fire-button.

Note that defenses you add during any month aren't figured into your defense points until the beginning of the next month, and also that island defenses treat foreign troops and rebels in the same fashion.

Weather

The Caribbean enjoys warm and sunny weather for the most part, but constant tropical showers (gray clouds) do roam over the islands, accelerating the growth of crops. Hurricane season, from May until November, brings both hurricanes and lesser tropical storms (black clouds).

Hurricanes are devastating, usually destroying everything in their path.

All weather systems start at the northwestern tip of Key Antigua, then move more or less southeast through the central part of the island and across St. Christopher. Because of this path, Key Antigua receives the most precipitation, while western sections of St. Christopher are arid and poorly suited to agriculture. This may seem an advantage to Key Antigua, but keep in mind that it also bears the brunt of hurricanes!

Tropical storms bring rain and winds, but only occasionally destroy industries. Hurricanes are unpredictable and devastating, usually destroying everything in their path. And, for each parcel of property destroyed, a corresponding portion of the population dies. Life in the tropics isn't always sunny!

Scoring

Islands' scoring is based on a complex socio/economic model that weighs not only current actions, but those taken many months past. You cannot switch from a military/industrial complex to an agrarian democracy and expect an instant increase in morale and productivity. You have five years in which to build up your island, at the end of which the player with the highest score wins. The maximum you can earn per month is 260 points, plus hospital bonuses.

Does ruling an island sound easy? Well, just remember that banana republics fall as easily as do crops during a hurricane! R

John Ryan is an air traffic control instructor and advanced machine language programmer who's experienced on a number of computer systems, including, of course, the Commodore.

Listing 1. Islands main program.

```
0 REM CREATE ISLANDS ML :REM*54
5 OPEN 8,8,8,"+ISLE ML ,P,W"
                        :REM*168
10 READ A$:IF A$="-1" THEN CLOS
   E8:END                :REM*78
15 IF LEN(A$)<62 THEN 55
                        :REM*254
20 B$=MID$(A$,1,20)+MID$(A$,22,
   20)+MID$(A$,43,20)  :REM*242
25 FOR I=1 TO 30        :REM*181
30 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*209
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*85
40 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55            :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                         :REM*67
50 NEXT:GOTO 10         :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 70                 :REM*184
60 IF LEN(A$)<42 THEN B$=LEFT$(
   A$,20)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 70           :REM*176
65 B$=LEFT$(A$,20)+MID$(A$,22,2
   0)+RIGHT$(A$,LEN(A$)-42)
                        :REM*140
70 FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                        :REM*140
80 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55             :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55             :REM*84
90 BY=H*16+L:PRINT#8,CHR$(BY);
                        :REM*148
95 NEXT:GOTO 10         :REM*160
100 REM C64 HEX DATA FOR ISLAND
    S                   :REM*217
101 DATA 008020118D20F98DA210 A
    9009D00C0CA10FAA20B 8E4A9AA
    2078E4B9AA204       :REM*130
102 DATA 8E769A8E779A20178620 E
    584A9DC85ABA91D8D38 9A8D399
    AA9FA8D4E9A8D        :REM*24
103 DATA 509AA9048D2E9AA9048D 9
    E9A8D9F9A8D9C9A8D9D 9A20B39
    4A98E20D2FFA2       :REM*185
104 DATA 008E309A8E14C078A991 8
    D1403A9888D150358A9 9320D2F
    FA9068D20D08D       :REM*201
105 DATA 21D0206D86A9088D8602 A
    9648D529A8D549AA201 86C7CA8
    E2F9A8E7B9A8E        :REM*67
106 DATA 539A8E559A8E4F9A8E51 9 ►
```

RUN it right: **C-64; two joysticks**

```
    A8EA09A8EA19A8E789A 8E799A8
    EA29A8EA59A8E          :REM*32
107 DATA 319A8E369A8AA2039D56 9
    ACA10FA2009842056 84 A9C0A20
    7A0DB200E86A2           :REM*5
108 DATA 28A000A93F919BA90891 A
    7C8CAD0F4A2008E939A 8E929A2
    0F593A2158E93         :REM*142
109 DATA 9AEE929A20F593A200BD 8
    5989D3A9AE8E008D0F5 A200209
    685A20020A285         :REM*217
110 DATA A9FF8D15D0A20E8EFA07 E
    88EFB07A9008D29D0A9 018D2AD
    0A92E8D04D08D         :REM*223
111 DATA 06D0A9408D05D0A9A08D 0
    7D0A2018E6B9ACA8E35 9AA9088
    D699AA9078D6A         :REM*221
112 DATA 9A20F28620028E20B394 A
    2008E319A20EB89A200 8E319AA
    9018D379AA203         :REM*174
113 DATA 20EB89A5C5C929D005A9 0
    18D14C0CE4B9AD01020 F286AD3
    09AF0034C0B8E           :REM*7
114 DATA A9078D4B9A20AA8720F4 8
    3A90085AA8D429A8D7C 9A8D379
    A20228CA20020         :REM*212
115 DATA C28620938 6A200200B82 A
    20020DA86202A8AAD31 9AF008A
    2008E319A20EB          :REM*22
116 DATA 89A20186AA8E379AE88E 4
    29AA20420C28620938 6 A202200
    B82A20420DA86         :REM*249
117 DATA 202A8AAD319AF00AA200 8
    E319AA20320EB894C69 81AC379
    AB9789AF00EA0          :REM*29
118 DATA 00B19BC920F006C925F0 0
    23860186 0AD709AF057 102BAE4
    29ABD04D0C928         :REM*217
119 DATA B004EE319A60A9028D7B 9
    A20F18520F38190062 0 D4854C9
    582BD04D038E9          :REM*93
120 DATA 109D04D060AE429ABD04 D
    0C9EE90034C1C82A902 8D7B9A2
    0D48520F38190         :REM*105
121 DATA 0620F1854C9582BD04D0 1
    869109D04D060AD719A F05210 2
    8E8BD04D0C932         :REM*190
122 DATA B0034C1C82A9508D7B9A 2
    0F18520F381900620D4 854C958
    2BD04D038E910         :REM*209
123 DATA 9D04D060E8BD04D0C9DD 9
    0034C1C82A9508D7B9A 20D4852
    0F381900620F1         :REM*119
124 DATA 854C9582BD04D0186910 9
    D04D060AD729AF00160 AE379AB
    D789AF0034C44          :REM*77
125 DATA 83BD389AC921D003FEA9 9
    AC925D0034C4483AC37 9AB9F39
    8A8B904D08D7A         :REM*200
126 DATA 9AAD379AD00FADA99AD0 0
    FAD7A9AC992B0454C0D 83ADAA9
    AD0F1AD7A9AC9         :REM*248
127 DATA 929036A000B19BC920F0 2
    EA8AE379ABDA99AF008 98C925F
    0204C2B8398C9         :REM*164
128 DATA BFD018AC379AB9A99AF0 0
    5203B8EB00BA9018D36 9A20918
    ACE369A60AC37         :REM*226
129 DATA 9AB9789AF061A000B19B C
    920F03DC925F00160B1 A7290FA
    C379AD9EF98D0          :REM*71
130 DATA 01602 03B8E9006206C8E B
    00160AD379A4901AAAC 379AB9A
    09ADDA09AF005         :REM*255
131 DATA 90034C88836020358B20 B
    394208F94AC379AA900 99789AC
    000D008A20020         :REM*143
132 DATA 96854C918AA20020A285 4
    C918AA000B19BC925D0 33B1A72
    90FAC379AD9EF          :REM*65
133 DATA 98F00160AC379AA90199 7
    89AA203BDFD98A8A920 919BA90
    691A7CA10F1A2         :REM*207
134 DATA 00AD379AF0034CBA854C A
    E85A000B19BC920D003 4C2B836
    0A9008D2C9ACE          :REM*18
135 DATA 2C9AD0FBCE2D9AD0F1A9 2
    88D2D9A60AE7B9ABDA0 95F0448
    D7C9AE8BDA095         :REM*187
136 DATA 8D7D9AE8BDA0958D489A 8
    D499AE88E7B9AAE7C9A AC7D9A1
    820F0FFA93F20         :REM*212
137 DATA D2FFCE489AD0F8AE7C9A E
    8AC7D9A1820F0FFA93F 20D2FFC
    E499AD0F84C09          :REM*86
138 DATA 8460AD11D009408D11D0 A
    90F8D22D0A9088D23D0 A945A20
    4A0D8200E86A9          :REM*44
139 DATA 288D7B9AA9008D689AA2 0
    0203985A93DA207A0DB 200E86A
    9018D689AA200         :REM*165
140 DATA 203985A9E7A204A0D820 0
    E86A9008D689A205685 A977A20
    6A0DA200E86A9         :REM*223
141 DATA 018D689A205685A9ADA2 0
    5A0D9200E86A9008D68 9AA200A
    000BD76983011         :REM*190
142 DATA F01618694091 9BAD689A 9
    1A7C8E84CC78420D485 E84CC58
    460A21F8E7D9A         :REM*168
143 DATA A9C7859BA995859CA909 8
    D7B9AA9008D7C9AA000 B19B8D7
    E9AA90085A9A9          :REM*21
144 DATA 3085AAAD7E9AF01218A5 A
    9690885A9A5AA690085 AACE7E9
    AD0EEA001A207           :REM*8
145 DATA B19B8891A9C8C8CA10F6 2
    0D485CE7D9AD0C460A0 00BD669
    8186940919BAD         :REM*247
146 DATA 689A91A7E8C8C003D0ED 2
    0D485E009D0E460A000 B96F98F
    00E18694091 9B         :REM*146
147 DATA AD689A91A7C84C588560 B
    DDE969DC002BDE6979D 0038E8E
    03FD0EF60BD1E          :REM*71
148 DATA 979DC002E8E03FD0F560 B
    D5E979D4003E8E03FD0 F560BDA
    6979D8003E8E0         :REM*172
149 DATA 3FD0F560BDA6979DC003 E
    8E03FD0F560BD26989D 8003E8E
    03FD0F560BD26         :REM*228
150 DATA 989DC003E8E03FD0F560 A
    9FF8D0FD4A9808D12D4 AD1BD46
    018A59B6D7B9A          :REM*84
151 DATA 859BA59C6900859C18A5 A
    76D7B9A85A7A5A86900 85A8603
    8A59BED7B9A85         :REM*196
152 DATA 9BA59CE900859C38A5A7 E
    D7B9A85A7A5A8E90085 A860859
    B85A7869C84A8          :REM*51
153 DATA 60A90085A7A9D085A8A9 0
    085A9A93085AAAD0EDC 29FE8D0
    EDCA50129FB85          :REM*80
154 DATA 01A210A000B1A791A9C8 D
    0F9205F86CAD0F1A501 0904850
    1AD0EDC09018D         :REM*238
155 DATA 0EDCAD18D029F0090C8D 1
    8D06018A5A8690185A8 A5AA690
    185AA60A91DA2          :REM*70
156 DATA 04A0D8200E86A9288D7B 9
    AA218A000A93F919BA9 0F91A7C
    8C00BD0F320D4          :REM*61
157 DATA 85CAD0EB60A202A9009D 7
    09ACA10FAA8AAB1AA4A B001884
    AB001C84AB001         :REM*139
158 DATA CA4AB001E84A8E709A8C 7
    19AA000B1AA29108D72 9A60BD3
    A9A859BE8BD3A         :REM*229
159 DATA 9A859CE8BD3A9A85A7E8 B
    D3A9A85A860A59B9D3A 9AE8A59
    C9D3A9AE8A5A7         :REM*140
160 DATA 9D3A9AE8A5A89D3A9A60 2
    0C989EE6B9AAD6B9AC9 1FD02CA
    9018D6B9A20A2         :REM*255
161 DATA 8EEE359AAD359AC90CD0 1
    AA9008D359AEE2F9AAD 2F9AC90
    5D003EE309AEE         :REM*119
162 DATA 699AD003EE6A9AA9B0A2 0
    5A0D9200E86A900AC6B 9A2091B
    320DDBD208187          :REM*78
163 DATA A9DBA205A0D9200E86AE 3
    59ABDB998AAA000BDC5 9818694
    0919BA90691A7         :REM*182
164 DATA C8E8C003D0EEA901A206 A
    0DA200E86AD6A9AAC69 9A2091B
    320DDBD208187          :REM*16
165 DATA 4CD989A200A000BD0001 F
    00E18694091 9BA90691 A7E8C84
    C8587A93F4891         :REM*109
166 DATA 9BA90F91A7C868919BA9 0
    F91A760CE2E9AD010A9 048D2E9
    AAD649AF00160         :REM*249
167 DATA AD659AF00160A9038D4D 9
    AAD359AC905900CC90B F008A90
    18D629A4CDD87         :REM*221
168 DATA A9008D629A20C685C90F 9
    0DBAD629AF0162 0C685 C999900
    F20C685C9B4B0         :REM*146
169 DATA 47A9008D639A4C0488A9 0
    F8D639AA200207E85A2 00208A8
    5AD639A8D27D0         :REM*221
170 DATA 8D28D0207588A9148D03 D
    0AD4D9A8D1DD0A20B8E F807A20
    D8EF907A9018D          :REM*86
171 DATA 649AA200205E88E8205E 8
```

```
    860A200206C85A2008E 4D9AE88
    E639A200E88A2            :REM*89
172 DATA 008E649AA9028D03D0E8 8
    E659A6020C685C919B0 06A9009
    D669A60C9E690            :REM*24
173 DATA 02A9FF9D669A60A2018E 0
    0D08E01D08E02D08E03 D0CA8E4
    C9A8E649A8E65           :REM*251
174 DATA 9A604CAB89488A489848 0
    8AD14C0F012209FFFA5 C5C940F
    0F7C929F0F3A9           :REM*191
175 DATA 008D14C0CE2E9AD00DA9 0
    68D2E9AADA29AF00320 E594CE4
    A9AD0C9A90B8D           :REM*150
176 DATA 4A9A203A95AD649AD008 A
    D659AD0034C7189AD00 D0F00CA
    D01D0F007C9FF           :REM*182
177 DATA F0034CF1882075884C71 8
    9AD00D0CD679AD005A2 01205E8
    8AD01D0CD669A           :REM*183
178 DATA D005A200205E88AD11D0 1
    0FBAD659AF00AAD00D0 C9EAD02
    24C2689AD00D0            :REM*43
179 DATA C9D0D018EE00D0EE02D0 E
    E4C9AAD349A49018D34 9AA8B9B
    5988D669AAD4C            :REM*59
180 DATA 9AD017AD00D0CD679A90 0
    9CE00D0CE02D04C5A89 EE00D0E
    E02D0AD01D0CD            :REM*84
181 DATA 669AB009EE01D0EE03D0 4
    C7189CE01D0CE03D0AD 659AF00
    34CB489207F89           :REM*232
182 DATA 4CAB89A238A000BD4003 9
    9849AC8E8C008D0F4A2 38A03FB
    D400399400388            :REM*74
183 DATA CAD0F6A200BD849A9D40 0
    3E8E008D0F5602868A8 68AA684
    C31EAAD339A49           :REM*233
184 DATA 018D339AA8B9B7988DF8 0
    7207F894CAB89A59B8D 6C9A859
    C8D6D9A85A88D           :REM*234
185 DATA 6E9A60AD6C9A859B85A7 A
    D6D9A859CAD6E9A85A8 60AC379
    AB9789AF00160           :REM*190
186 DATA B9769AC91CD008A90099 7
    69A4C098A1869049976 9AA8B98
    D98AC379A9938           :REM*114
187 DATA 9ABDE998859B85A7E8BD E
    998859CE8BDE99885A8 20918A6
    0A9288D7B9AA9            :REM*89
188 DATA 008D5A9A8D7C9AA2038E 8
    09ACA8E819AA948A204 A0D8200
    E86A94E85A5A9            :REM*82
189 DATA 9A85A6AC5A9AB1A58D5B 9
    AC8B1A5C8C8C88C5A9A AC5B9A2
    091B320DDBD20            :REM*77
190 DATA 818720D485CE809AD0DB C
    E819AF015A940A207A0 DB200E8
    6A0028C5A9AC8           :REM*182
191 DATA 8C809A4C518A60A200AC 3
    79AB9389A8D5E9AA000 BD8D98C
    D5E9AF008E8E8           :REM*231
192 DATA E8E8C84C9E8AAD369AF0 3
    D8C5F9A8E609A98AAAC 379AB9F
    198A838B9529A            :REM*88
193 DATA FDF5988D5C9AC8B9529A E
    9008D5D9A0D5C9AF003 B00160A
    D5D9A99529A88           :REM*195
194 DATA AD5C9A99529AAC5F9AAE 6
    09AA9808D459AB9AD98 8D689AA
    0002408BC820            :REM*207
195 DATA 408BA0282408BC82040 8
    BAC379AB9A99AF01720 B394203
    58B208F94AD37           :REM*202
196 DATA 9AD00620C38C4C2C8B20 B
    B8CA9008DA99A8DAA9A 60A9048
    D2E9AA9008DA2           :REM*129
197 DATA 9A60BD8D98C925D01298 4
    8AC379AB9EF988D689A A9008D4
    59A68A8BD8D98           :REM*147
198 DATA 186D459A919BAD689A91 A
    7E86038AD00D0E9188D 749A38A
    D01D0E9328D75            :REM*94
199 DATA 9AA00084F784F8AD749A 4
    A4A4A8D749AAD759A4A 4A4A8D7
    59AAE759AF010           :REM*149
200 DATA 18A5F7692885F7A5F869 0
    085F8CAD0F018A5F76D 749A85F
    7A5F8690085F8           :REM*126
201 DATA AD659AF008A9298D479A 4
    CC88BA92A8D479A18A5 F76D479
    A85F785F9A5F8           :REM*165
202 DATA 690485F818A5F869D485 F
    A6020698BA000B1F738 E980C91
    DF008C8C002D0           :REM*226
203 DATA F24C218CADA29AD006EE A
    29A20BE94AD01D0C992 B005A00
    04C0F8CA00218           :REM*142
204 DATA B9529A690199529AC8B9 5
    29A690099529A60AD65 9AD008A
    D639AF00B4CE0            :REM*78
205 DATA 8BA9C88D449A4C3C8CA9 E
    B8D449AAD00D0C91890 9DC9EFB
    099AD01D0C932           :REM*254
206 DATA 9092C9DCB08E20C685CD 4
    49A90862069BBA9BF8D 8C9AA20
    0A00038B1F78D           :REM*116
207 DATA 759AE9808D749ABD8D98 C
    D749AF019AD759AC925 D008A92
    08D8C9A4C928C            :REM*85
208 DATA E8E8E8E8C8C008D0E060 A
    203BDFD98A8AD8C9A91 F7A9089
    1F9CA10F020B3           :REM*253
209 DATA 9420358B208F94AD8C9A C
    925F028AD01D0C992B0 08A9008
    D929A4CC88CA9             :REM*7
210 DATA 018D929A20C685C91FB0 F
    98D989AAE929ABDF198 AA20378
    F60AE929ABD9E             :REM*8
211 DATA 9AF003DE9E9A60AE929A B
    D9E9AC90AF003FE9E9A 60AE929
    ABD9C9AC90AF0            :REM*39
212 DATA 03FE9C9A60AE929ABD9C 9
    AF003DE9C9A6020F98D 208AFFA
    D11D029BF8D11           :REM*105
213 DATA D0A9088D15D0A90E8DFB 0
    7A20086C720AE85A900 8D2AD08
    D7B9AA98C8D06            :REM*42
214 DATA D0A94E8D07D0A9068D21 D
    08D20D0A99320D2FF20 1786A91
    58D7D9AA90985           :REM*141
215 DATA 9BA999859C20F284A908 8
    D8602200984A200A920 9DE0059
    DE006E8D0F7A9           :REM*224
216 DATA 018D8602A200A0141820 F
    0FFA9C6A099201EABA9 078D860
    2A20DA00E1820            :REM*89
217 DATA F0FFA9D4A099201EABA9 0
    F8D8602A20EA00E1820 F0FFA9D
    CA099201EABA2           :REM*132
218 DATA 10A0071820F0FFA9018D 8
    602A9F9A099201EABA2 18A0001
    820F0FFA9E4A0           :REM*250
219 DATA 99201EAB20028E20DD8D 6
    0A9008D860285C6A214 A00B182
    0F0FFA911A09A           :REM*177
220 DATA 201EAB20E4FFF0FB60AD 1
    1D029EF8D11D060AD11 D009108
    D11D060A90085           :REM*207
221 DATA C720B394208F94A9008D 1
    5D0A9018D8602A200A0 021820F
    0FFA91FA09A20            :REM*10
222 DATA 1EABA9008D860285C620 E
    C8D4C008038A59BE952 85FBA59
    CE90085FCA203           :REM*213
223 DATA A000B1FBC998F018C8C8 C
    006D0F418A5FB695085 FBA5FC6
    90085FCCAD0E2            :REM*11
224 DATA 1860360AD7A9A48AC37 9
    AB9F398A8B904D08D7A 9AAD379
    AD016AD7A9AC9            :REM*40
225 DATA 8A90094C8C8E688D7A9A 1
    860688D7A9A3860AD7A 9AC992B
    0F34C8C8EA900           :REM*223
226 DATA 8D929A20858FEE929A20 8
    58FA9008D929A206990 A0008C9
    39A20F593EE92           :REM*190
227 DATA 9A206990A0158C939A20 F
    5936020C989A9288D7B 9AA9008
    D8D9AAE8F9ABD            :REM*11
228 DATA 059948E8BD0599481869 D
    4A868AA68200E86AE8E 9AA000B
    19BCD909AD00C            :REM*58
229 DATA B1A7290FCD919AD003EE 8
    D9AC8C01DD0E820D485 CAD0E02
    0D989608D959A           :REM*164
230 DATA AE929ABD789A186D959A A
    A60AE929ABDF198AA60 AE929AA
    D8D9A608E999A            :REM*63
231 DATA AD989A8D939AA9008D94 9
    A20519 0B00FAE999AA9 009D4E9
    AE89D4E9A4C6F           :REM*221
232 DATA 8FAE999ABD4E9AED989A 9
    D4E9AE8BD4E9AE9009D 4E9A606
    018BD529A6D93            :REM*69
233 DATA 9A9D529AE8BD529A6D94 9
    A9D529A60A20C8E8E9A AC929AB
    9F1988D8F9AA9           :REM*138
234 DATA 808D909AA9078D919A20 C
    F8E20308F9D00C0A9AF 8D909A2
    0CF8E20308F9D           :REM*202
235 DATA 02C0A99D8D909AA90D8D 9
    19A20CF8E20308F9D04 C0A9988
    D909AA9008D91           :REM*239
```

Continued on p. 91.

Net Worth Calculator

Keep a record of your assets and liabilities that can be updated in a snap on your C-128.

◇

By BARBARA SCHULAK

My husband and I have had to fill out personal financial statements for our bank several times in the past few years. Each time we've had to start from scratch, so when it came time again to update the form, I decided to write Net Worth Calculator for the C-128. Now we have a permanent record, and we can easily update it.

Type in the program, using *RUN*'s Checksum to alert you to mistakes as you enter the listing. Save it, then load and run it.

Following the initial title screen, the computer will draw the page you'll be working on. Across the top of the screen is the menu bar. It contains the Load and Save options, Print, Assets, Liabilities, Calculate, Directory, Help (whose screen appears below the work page) and Exit. Under the bar are the Assets and Liabilities columns. Some of the assets listed are cash, stocks, real estate, vehicles and household goods. Liabilities include outstanding credit card balances, mortgages and notes payable to others. The space at the bottom of the screen is used for inputting data.

FIGURING YOUR NET WORTH

To begin, you'll want to create a new file; so, with the left-right cursor key, highlight the Assets option in the menu bar and press return. The first item in the Assets column will be highlighted. Use the up-down cursor to select an item for which you have data. Press the plus-sign key, then type the item's value, which will appear in the cell next to the item description when you press return. Use the minus-sign and return keys to change an entry. Later, when you need to zero, or wipe out, a figure, use the Z and return keys. Entries should be in whole dollar amounts, and you needn't use commas in numbers; they are automatically inserted, if applicable, when you enter an amount.

$35300
$4075
$416
$17094
$63,116
$811
$34

Use the Help option any time you need to see the list of key controls needed to use the program, and press the no-scroll key in the top row of your keyboard to freeze the Help screen if it doesn't remain long enough for you to read. Press any key to deactivate the no-scroll.

When you've entered all of your assets, press return to go back to the menu bar and select Liability. Repeat the same procedure to enter or change figures in the Liability column. When you're done, return to the menu bar.

Now select Calc. It will automatically figure your total assets, liabilities and net worth.

Use the Save option to save your work page. If you need a hard copy of your work page, choose the Print option and follow the prompts.

When you reload Net Worth Calculator, press return on the Load option and enter the filename of the work page you wish to use. If you don't remember the filename, use the View option to get a listing of the disk directory. Before leaving the program with the Exit option, be sure to save your file if you have added or made any changes to your data. You may also cancel any operation such as Load, Save or Print by entering return at the first prompt.

One more thing: You can enter values up to 999,999,999, although that's not useful for most of us. But who knows? Maybe you'll win a lottery! Ⓡ

In addition to programming for the Commodore and fulfilling her functions as maid, chef and chauffeur, Barbara Schulak coaches her daughter's softball team.

Listing 1. Net Worth Calculator program.

```
0 REM PERSONAL NET WORTH CALCUL
  ATOR - BARBARA SCHULAK:REM*31
10 COLOR6,1:PRINTCHR$(8)
                        :REM*177
20 PRINT"{SHFT CLR}{3 CRSR DNs}
  {CTRL 2}"TAB(26)"{COMD A}{25
   SHFT *s}{COMD S}"    :REM*50
30 PRINTTAB(26)"{SHFT -}{CTRL 9
  }{COMD 7}{4 SPACEs}PERSONAL
  NET WORTH{3 SPACEs}{CTRL 0}{
  CTRL 2}{SHFT -}"        :REM*16
40 PRINTTAB(26)"{SHFT -}{CTRL 9
  }{COMD 7}{8 SPACEs}CALCULATO
  R{7 SPACEs}{CTRL 0}{CTRL 2}{
  SHFT -}"               :REM*217 ►
```

RUN it right: **C-128 (80-Column mode)**

ILLUSTRATED BY TIM TEEBKIN

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► LABEL MAKER	Create and print out multiple copies of mailing labels
► ARITHME-SKETCH	Great educational programs for elementary school students
► MURDER BY BYTE	Find out who committed the crime in this colorful "whodunit" for your 128
► DISK KEEPER	Maintain your disks with this handy all-purpose program
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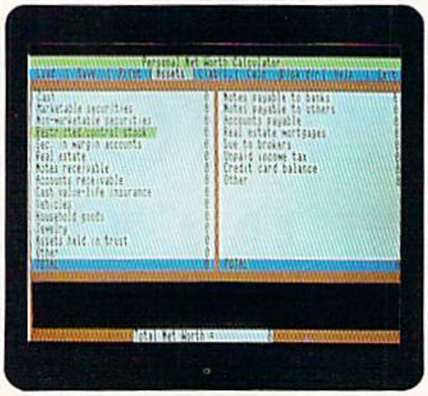

The menu bar, work page and input area help figure your net worth in a snap.

```
50 PRINTTAB(26)"{COMD Q}{25 SHF
   T *s}{COMD W}"          :REM*192
60 PRINTTAB(26)"{SHFT -} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {SHFT
   -}"                     :REM*167
70 PRINTTAB(26)"{SHFT -} {SHFT
   -}{CTRL 9}{CTRL 5} 7 {CTRL 0
   }{CTRL 2}{SHFT -} {SHFT -}{C
   TRL 9}{CTRL 5} 8 {CTRL 0}{CT
   RL 2}{SHFT -} {SHFT -}{CTRL
   9}{CTRL 5} 9 {CTRL 0}{CTRL 2
   }{SHFT -} {SHFT -}{CTRL 9}{C
   OMD 6} - {CTRL 0}{CTRL 2}{SH
   FT -} {SHFT -}"          :REM*66
80 PRINTTAB(26)"{SHFT -} {COMD
   Z}{3 SHFT *s}{COMD X} {COMD
   Z}{3 SHFT *s}{COMD X} {COMD
   Z}{3 SHFT *s}{COMD X} {COMD
   Z}{3 SHFT *s}{COMD X} {SHFT
   -}"                      :REM*60
90 PRINTTAB(26)"{SHFT -} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {COMD
   A}{3 SHFT *s}{COMD S} {SHFT
   -}"                      :REM*70
100 PRINTTAB(26)"{SHFT -} {SHFT
     -}{CTRL 9}{CTRL 5} 4 {CTRL
     0}{CTRL 2}{SHFT -} {SHFT -
    }{CTRL 9}{CTRL 5} 5 {CTRL 0
    }{CTRL 2}{SHFT -} {SHFT -}{
    CTRL 9}{CTRL 5} 6 {CTRL 0}{
    CTRL 2}{SHFT -} {SHFT -}{CT
    RL 9}{COMD 6} / {CTRL 0}{CT
    RL 2}{SHFT -} {SHFT -}"
                           :REM*255
110 PRINTTAB(26)"{SHFT -} {COMD
     Z}{3 SHFT *s}{COMD X} {COM
    D Z}{3 SHFT *s}{COMD X} {CO
    MD Z}{3 SHFT *s}{COMD X} {C
    OMD Z}{3 SHFT *s}{COMD X} {
    SHFT -}"               :REM*222
120 PRINTTAB(26)"{SHFT -} {COMD
     A}{3 SHFT *s}{COMD S} {COM
    D A}{3 SHFT *s}{COMD S} {CO
    MD A}{3 SHFT *s}{COMD S} {C
    OMD A}{3 SHFT *s}{COMD S} {
    SHFT -}"                :REM*96
130 PRINTTAB(26)"{SHFT -} {SHFT
     -}{CTRL 9}{CTRL 5} 1 {CTRL
     0}{CTRL 2}{SHFT -} {SHFT -
    }{CTRL 9}{CTRL 5} 2 {CTRL 0
    }{CTRL 2}{SHFT -} {SHFT -}{
    CTRL 9}{CTRL 5} 3 {CTRL 0}{
    CTRL 2}{SHFT -} {SHFT -}{CT
    RL 9}{COMD 6} * {CTRL 0}{CT
    RL 2}{SHFT -} {SHFT -}"
                           :REM*101
140 PRINTTAB(26)"{SHFT -} {COMD
     Z}{3 SHFT *s}{COMD X} {COM
    D Z}{3 SHFT *s}{COMD X} {CO
    MD Z}{3 SHFT *s}{COMD X} {C
    OMD Z}{3 SHFT *s}{COMD X} {
    SHFT -}"               :REM*192
150 PRINTTAB(26)"{SHFT -} {COMD
     A}{3 SHFT *s}{COMD S} {COM
    D A}{3 SHFT *s}{COMD S} {CO
    MD A}{3 SHFT *s}{COMD S} {C
    OMD A}{3 SHFT *s}{COMD S} {
    SHFT -}"                 :REM*2
160 PRINTTAB(26)"{SHFT -} {SHFT
     -}{CTRL 9}{CTRL 5} 0 {CTRL
     0}{CTRL 2}{SHFT -} {SHFT -
    }{CTRL 9}{COMD 6} . {CTRL 0
    }{CTRL 2}{SHFT -} {SHFT -}{
    CTRL 9}{COMD 6} = {CTRL 0}{
    CTRL 2}{SHFT -} {SHFT -}{CT
    RL 9}{COMD 6} + {CTRL 0}{CT
    RL 2}{SHFT -} {SHFT -}"
                           :REM*250
170 PRINTTAB(26)"{SHFT -} {COMD
     Z}{3 SHFT *s}{COMD X} {COM
    D Z}{3 SHFT *s}{COMD X} {CO
    MD Z}{3 SHFT *s}{COMD X} {C
    OMD Z}{3 SHFT *s}{COMD X} {
    SHFT -}"               :REM*226
180 PRINTTAB(26)"{COMD Z}{25 SH
    FT *s}{COMD X}"        :REM*168
190 SLEEP2                 :REM*106
200 DIMM$(9),A$(15),L$(9),A(15)
    ,L(9):F$="":FM$="{CTRL 9}##
    #,###,###":NM=9:NA=14:NL=8
                           :REM*122
210 FP$="###,###,###"       :REM*48
220 FORI=1TONM:READM$(I):NEXT
                            :REM*72
230 DATA "{CTRL 9}{2 SPACEs}LOA
    D{2 SPACEs}{COMD M}","{CTRL
     9}{2 SPACEs}SAVE{2 SPACEs}
    {COMD M}","{CTRL 9}{2 SPACE
    s}PRINT {COMD M}","{CTRL 9}
     ASSETS {COMD M}","{CTRL 9}
     LIABIL.{COMD M}","{CTRL 9}
    {2 SPACEs}CALC{2 SPACEs}{CO
    MD M}","{CTRL 9}DISK DIR{CO
    MD M}","{CTRL 9}{2 SPACEs}H
    ELP{2 SPACEs}{COMD M}","{CT
    RL 9}{2 SPACEs}EXIT {COMD M
    }"                      :REM*44
240 FORI=1TONA:READA$(I):NEXT
                           :REM*131
250 DATA" CASH{22 SPACEs}"
                             :REM*7
260 DATA" MARKETABLE SECURITIES
    {5 SPACEs}"             :REM*36
270 DATA" NON-MARKETABLE SECURI
    TIES "                 :REM*176
280 DATA" RESTRICTED/CONTROL ST
    OCK{2 SPACEs}"         :REM*188
290 DATA" SEC. IN MARGIN ACCOUN
    TS{3 SPACEs}"          :REM*219
300 DATA" REAL ESTATE{15 SPACEs
    }"                     :REM*108
310 DATA" NOTES RECEIVABLE{10 S
    PACEs}"                 :REM*72
320 DATA" ACCOUNTS RECEIVABLE{7
     SPACEs}"               :REM*69
330 DATA" CASH VALUE-LIFE INSUR
    ANCE "                  :REM*28
340 DATA" VEHICLES{18 SPACEs}"
                           :REM*187
350 DATA" HOUSEHOLD GOODS{11 SP
    ACEs}"                  :REM*64
360 DATA" JEWELRY{19 SPACEs}"
                           :REM*112
370 DATA" ASSETS HELD IN TRUST{
    6 SPACEs}"             :REM*172
380 DATA" OTHER{21 SPACEs}"
                           :REM*195
390 FORI=1TONL:READL$(I):NEXT
                           :REM*209
400 DATA" NOTES PAYABLE TO BANK
    S{3 SPACEs}"            :REM*51
410 DATA" NOTES PAYABLE TO OTHE
    RS{2 SPACEs}"           :REM*96
420 DATA" ACCOUNTS PAYABLE{9 SP
    ACEs}"                 :REM*101
430 DATA" REAL ESTATE MORTGAGES
    {4 SPACEs}"             :REM*10
440 DATA" DUE TO BROKERS{11 SPA
    CEs}"                  :REM*255
450 DATA" UNPAID INCOME TAX{8 S
    PACEs}"                :REM*148
460 DATA" CREDIT CARD BALANCE{6
     SPACEs}"                :REM*3
470 DATA" OTHER{20 SPACEs}"
                            :REM*36
480 PRINT"{SHFT CLR}{CTRL 9}{CO
    MD 6}{25 SPACEs}PERSONAL NE
    T WORTH CALCULATOR{26 SPACE
    s}{COMD 7}";            :REM*83
490 FORI=1TONM:PRINTM$(I);:NEXT
                           :REM*115
500 PRINT"{COMD 3}{CTRL 9}{80 S
    PACEs}";                :REM*23
510 FORI=1TO15:PRINT"{CTRL 9}{C
    OMD 3} {39 CRSR RTs} {38 CR
    SR RTs} ";:NEXT        :REM*150
520 PRINT"{COMD 3}{CTRL 9}{80 S
    PACEs}";               :REM*234
530 FORI=1TO4:PRINT"{CTRL 9}{CO
    MD 3} {78 CRSR RTs} ";:NEXT
                           :REM*107
540 PRINT"{COMD 3}{CTRL 9}{80 S
    PACEs}"                :REM*128
550 COLOR5,2               :REM*199
560 FORI=1TO14:CHAR,1,I+2,A$(I)
    ,1:NEXT                  :REM*3
570 COLOR5,15:CHAR,1,17," TOTAL
    {21 SPACEs}",1          :REM*32
580 COLOR5,2:FORI=1TO8:CHAR,41,
    I+2,L$(I),1:NEXT        :REM*12
590 FORI=1TO6:CHAR,41,I+10,"{26
     SPACEs}",1:NEXT       :REM*239
```

```
600 COLOR5,15:CHAR,41,17," TOTA
    L{20 SPACEs}",1    :REM*103
610 COLOR5,2:FORI=1TONA:CHAR,28
    ,I+2,"",1:PRINTUSINGFM$;A(I
    ):NEXT              :REM*92
620 COLOR5,15:CHAR,28,17,"":PRI
    NTUSINGFM$;A(NA+1)   :REM*9
630 COLOR5,2:FORI=1TONL:CHAR,67
    ,I+2,"",1:PRINTUSINGFM$;L(I
    ):NEXT              :REM*27
640 FORI=1TO6:CHAR,66,I+10,"{13
     SPACEs}",1:NEXT   :REM*127
650 COLOR5,15:CHAR,67,17,"":PRI
    NTUSINGFM$;L(NL+1) :REM*102
660 COLOR5,2:FORI=1TONA:CHAR,39
    ,I+2," ",1:NEXT     :REM*141
670 FORI=1TONA:CHAR,78,I+2," ",
    1:NEXT              :REM*203
680 COLOR5,15:CHAR,39,17," ",1:
    CHAR,78,17," ",1    :REM*175
690 GOSUB1370:GOSUB1340:REM*186
700 :                   :REM*244
710 X=1:R=3:GOSUB1400   :REM*223
720 GETKEYK$            :REM*210
730 IFK$="{CRSR RT}"THENBEGIN:G
    OSUB1390:X=X+1:IFX>9THENX=1
                        :REM*162
740 GOSUB1400:BEND      :REM*58
750 IFK$="{CRSR LF}"THENBEGIN:G
    OSUB1390:X=X-1:IFX<1THENX=9
                        :REM*40
760 GOSUB1400:BEND      :REM*70
770 IFK$<>CHR$(13)THEN720
                        :REM*78
780 PRINTCHR$(7);       :REM*190
790 IFX=9THENPRINT"{2 HOMEs}{SH
    FT CLR}":END        :REM*225
800 ONXGOSUB840,950,1060,1570,1
    730,1280,1230,1420 :REM*252
810 IFX=7THEN480        :REM*212
820 IFX=1THEN610        :REM*169
830 GOTO720             :REM*142
840 COLOR5,8:CHAR,2,20,"ENTER F
    ILENAME: {COMD 6}"  :REM*67
850 TY=4:L=15:GOSUB1890:IFCT=0T
    HEN930              :REM*10
860 F$=V$:DOPEN#2,(F$),R
                        :REM*243
870 COLOR5,11:CHAR,2,21,"DISK S
    TATUS:{4 SPACEs}{CTRL 2}":P
    RINTDS$             :REM*190
880 IFDS<>0THENSLEEP2:GOTO920
                        :REM*61
890 FORI=1TONA+1:INPUT#2,A(I):N
    EXT                 :REM*144
900 FORI=1TONL+1:INPUT#2,L(I):N
    EXT                 :REM*160
910 INPUT#2,NW          :REM*226
920 DCLOSE#2            :REM*224
930 GOSUB1370:RETURN    :REM*56
940 :                   :REM*229
950 COLOR5,8:CHAR,2,20,"ENTER F
    ILENAME: {COMD 6}"  :REM*186
960 TY=4:L=15:GOSUB1890:IFCT=0T
    HEN1040             :REM*105
970 F$=V$:SCRATCH(F$):DOPEN#2,(
    F$),W               :REM*195
980 COLOR5,11:CHAR,2,21,"DISK S
    TATUS:{4 SPACEs}{CTRL 2}":P
```

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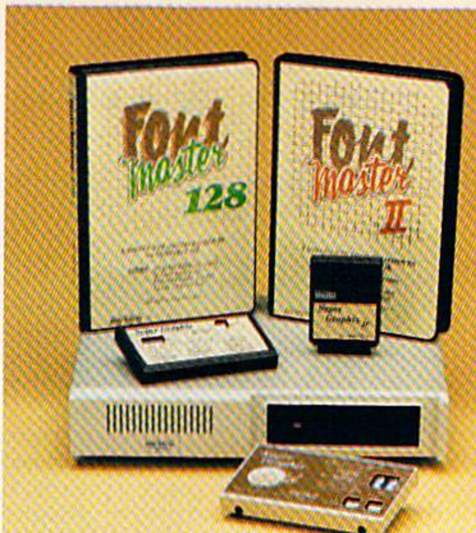

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```
    RINTDS$                   :REM*40
990 IFDS<>0THENSLEEP2:GOTO1030
                              :REM*23
1000 FORI=1TONA+1:PRINT#2,A(I):
     NEXT                    :REM*203
1010 FORI=1TONL+1:PRINT#2,L(I):
     NEXT                    :REM*217
1020 PRINT#2,NW              :REM*111
1030 DCLOSE#2                 :REM*85
1040 GOSUB1370:RETURN        :REM*174
1050 :                        :REM*80
1060 COLOR5,8:CHAR,2,20,"PRINTE
     R READY [Y/N]:"         :REM*245
1070 GETKEYK$:IFK$<>"Y"THEN1210
                              :REM*44
1080 COLOR5,14:CHAR,2,21,"PRINT
     ING..."                 :REM*247
1090 OPEN4,4                 :REM*155
1100 PRINT#4,"{30 SPACEs}PERSON
     AL NET WORTH"            :REM*41
1110 FORI=1TO79:PRINT#4,"-";:NE
     XT:PRINT#4                :REM*6
1120 PRINT#4," ASSETS{35 SPACEs
     }LIABILITIES"            :REM*22
1130 FORI=1TO79:PRINT#4,"-";:NE
     XT:PRINT#4               :REM*26
1140 FORI=1TO8:PRINT#4,A$(I);:P
     RINT#4,USINGFP$;A(I);:PRIN
     T#4,"{3 SPACEs}";L$(I);:PR
     INT#4,USINGFP$;L(I):NEXT
                             :REM*255
1150 FORI=9TO14:PRINT#4,A$(I);:
     PRINT#4,USINGFP$;A(I):NEXT
                              :REM*47
1160 FORI=1TO79:PRINT#4,"-";:NE
     XT:PRINT#4               :REM*52
1170 PRINT#4, " TOTAL ASSETS{14
      SPACEs}";:PRINT#4,USINGFP
     $;A(15);:PRINT#4,"{3 SPACE
     s}TOTAL LIABILITES{10 SPAC
     Es}";:PRINT#4,USINGFP$;L(9
     )                       :REM*152
1180 FORI=1TO79:PRINT#4,"-";:NE
     XT:PRINT#4              :REM*200
1190 PRINT#4," TOTAL PERSONAL N
     ET WORTH{2 SPACEs}";:PRINT
     #4,USINGFP$;NW           :REM*55
1200 FORI=1TO79:PRINT#4,"-";:NE
     XT:PRINT#4              :REM*220
1210 GOSUB1370:RETURN         :REM*65
1220 :                       :REM*250
1230 PRINT"{SHFT CLR}{COMD 3}{C
     TRL 9}{33 SPACEs}VIEW DIRE
     CTORY{33 SPACEs}{CRSR DN}{
     CTRL 2}"                 :REM*98
1240 WINDOW26,2,60,24        :REM*118
1250 DIRECTORY               :REM*213
1260 GOSUB1480:PRINT"{2 HOMEs}"
     :RETURN                 :REM*180
1270 :                        :REM*53
1280 COLOR5,8:CHAR,2,20,"CALCUL
     ATING..."                :REM*75
1290 TA=0:FORI=1TONA:TA=TA+A(I)
     :NEXT:A(15)=TA          :REM*243
1300 TL=0:FORI=1TONL:TL=TL+L(I)
     :NEXT:L(9)=TL            :REM*74
1310 COLOR5,15:CHAR,28,17,"":PR
     INTUSINGFM$;A(NA+1)
                             :REM*186
1320 COLOR5,15:CHAR,67,17,"":PR
     INTUSINGFM$;L(NL+1):REM*25
1330 NW=TA-TL                :REM*148
1340 COLOR5,2:CHAR,23,23,"TOTAL
      NET WORTH = ",1:PRINTUSIN
     GFM$;NW                  :REM*86
1350 GOSUB1370:RETURN        :REM*213
1360 :                       :REM*143
1370 FORI=19TO22:CHAR,1,I,"{78
     SPACEs}":NEXT:RETURN
                              :REM*24
1380 :                       :REM*155
1390 COLOR5,15:CHAR,(X-1)*9,1,M
     $(X),1:RETURN            :REM*70
1400 COLOR5,16:CHAR,(X-1)*9,1,M
     $(X),1:RETURN            :REM*87
1410 :                       :REM*185
1420 COLOR5,14:CHAR,1,19,"{2 SP
     ACEs}CURSOR RIGHT/LEFT TO
     HIGHLIGHT MENU BAR{18 SPAC
     Es}RETURN TO SELECT{3 SPAC
     Es}",1                  :REM*140
1430 CHAR,1,20,"{78 SHFT *s}",1
                             :REM*244
1440 CHAR,1,21,"{2 SPACEs}CURSO
     R UP/DOWN TO HIGHLIGHT CAT
     EGORIES FOR ASSETS AND LIA
     BILITIES{11 SPACEs}",1
                              :REM*60
1450 CHAR,1,22,"{2 SPACEs}+, -,
      Z KEYS TO ENTER VALUES{29
      SPACEs}RETURN TO EXIT{5 S
     PACEs}",1               :REM*151
1460 SLEEP15:GOSUB1370:RETURN
                             :REM*159
1470 :                       :REM*253
1480 COLOR5,11:CHAR,0,22,"PRESS
      RETURN TO CONTINUE."
                             :REM*175
1490 GETKEYK$:IFK$<>CHR$(13)THE
     N1490                    :REM*65
1500 RETURN                  :REM*108
1510 :                        :REM*38
1520 COLOR5,2:CHAR,1,Y+2,A$(Y),
     1:RETURN                :REM*221
1530 COLOR5,14:CHAR,1,Y+2,A$(Y)
     ,1:RETURN               :REM*137
1540 COLOR5,2:CHAR,41,Y+2,L$(Y)
     ,1:RETURN               :REM*176
1550 COLOR5,14:CHAR,41,Y+2,L$(Y
     ),1:RETURN               :REM*58
1560 :                        :REM*84
1570 Y=1:GOSUB1530           :REM*237
1580 GETKEYK$                 :REM*58
1590 IFK$="{CRSR DN}"THENBEGIN:
     GOSUB1520:Y=Y+1:IFY>14THEN
     Y=1                     :REM*146
1600 GOSUB1530:BEND          :REM*178
1610 IFK$="{CRSR UP}"THENBEGIN:
     GOSUB1520:Y=Y-1:IFY<1THENY
     =14                      :REM*94
1620 GOSUB1530:BEND          :REM*166
1630 IFK$=CHR$(13)THENGOSUB1520
     :RETURN                  :REM*42
1640 IFK$<>"+"ANDK$<>"-"ANDK$<>
     "Z"THEN1580              :REM*12
1650 S$=K$:PRINTCHR$(7);
                             :REM*197
1660 IFS$="Z"THENA(Y)=0:GOTO170
     0                        :REM*55
1670 COLOR5,8:CHAR,2,20,"ENTER:
      {CTRL 2}"              :REM*242
1680 TY=2:L=9:GOSUB1890:IFCT=0T
     HEN1710                  :REM*52
1690 IFS$="+"THENA(Y)=A(Y)+VAL(
     V$):ELSEA(Y)=A(Y)-VAL(V$)
                             :REM*211
1700 COLOR5,2:CHAR,28,Y+2,"":PR
     INTUSINGFM$;A(Y)   :REM*205
1710 GOSUB1370:GOTO1580:REM*212
1720 :                       :REM*244
1730 Y=1:GOSUB1550           :REM*190
1740 GETKEYK$                :REM*218
1750 IFK$="{CRSR DN}"THENBEGIN:
     GOSUB1540:Y=Y+1:IFY>8THENY
     =1                      :REM*224
1760 GOSUB1550:BEND           :REM*91
1770 IFK$="{CRSR UP}"THENBEGIN:
     GOSUB1540:Y=Y-1:IFY<1THENY
     =8                      :REM*106
1780 GOSUB1550:BEND           :REM*79
1790 IFK$=CHR$(13)THENGOSUB1540
     :RETURN                 :REM*246
1800 IFK$<>"+"ANDK$<>"-"ANDK$<>
     "Z"THEN1740              :REM*98
1810 S$=K$:PRINTCHR$(7);
                             :REM*100
1820 IFS$="Z"THENL(Y)=0:GOTO186
     0                       :REM*191
1830 COLOR5,8:CHAR,2,20,"ENTER:
      {CTRL 2}"               :REM*81
1840 TY=2:L=9:GOSUB1890:IFCT=0T
     HEN1870                 :REM*206
1850 IFS$="+"THENL(Y)=L(Y)+VAL(
     V$):ELSEL(Y)=L(Y)-VAL(V$)
                             :REM*207
1860 COLOR5,2:CHAR,67,Y+2,"":PR
     INTUSINGFM$;L(Y)     :REM*0
1870 GOSUB1370:GOTO1740 :REM*91
1880 :                       :REM*149
1890 V$="":K$="":CT=0:SYS52684,
     192,10                  :REM*214
1900 GETKEYK$                :REM*123
1910 IFK$=CHR$(13)THEN2030
                               :REM*4
1920 IFK$=CHR$(20)ANDCT<>0THENP
     RINT"{CRSR LF} {CRSR LF}";
     :CT=CT-1:V$=LEFT$(V$,CT):G
     OTO1900                 :REM*122
1930 IFK$=" "THEN2000    :REM*122
1940 REMIFK$="."THEN8110:REM*12
1950 IFTY=1OR TY>2THENIF(K$>"@"
     )AND(K$<"[")THEN2000
                             :REM*201
1960 IFTY>1THENIF(K$>"/")AND(K$
     <":")THEN2000            :REM*78
1970 IFTY=4THENIF(K$>" ")AND(K$
     <"0")THEN2000           :REM*205
1980 IFTY=4THENIF(K$>"9")AND(K$
     <"@")THEN2000           :REM*126
1990 GOTO1900                  :REM*7
2000 IFCT>=LTHEN1900         :REM*240
2010 CT=CT+1:V$=V$+K$:PRINTK$;
                              :REM*49
2020 GOTO1900                 :REM*33
2030 IFCT=0THENFL=0           :REM*23
2040 SYS52684,160,10:RETURN
                            :REM*123 ■
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Video Poker

We bet you can recreate casino action with this entertaining game.

◇

By TONY BRANTNER

Video Poker is a one-player game for the C-64 that lets you try your luck at the draw without risking loss of your shirt. Written in Basic and controlled with a joystick plugged into port 2, it takes about 30 seconds to initialize.

You start play with a balance of $100, then, at the beginning of each hand, place a bet of up to $50, but no more than your balance. Push the joystick forward to raise your bet and pull back to lower it.

Once you've settled on an amount, press the fire-button, and the cards at the top of the screen will turn over. To choose to hold any card, move the flashing cursor under it and press the fire-button. A "Hold" message will appear to indicate your choice. If you change your mind, press the fire-button again to clear the message.

After making your choices, pull the joystick back so that the cursor flashes on the "Draw" box and press the fire-button. The original cards you "discarded" will be replaced with new ones from the deck. After you "draw," the computer will evaluate your hand for the best combination and add any winnings to your balance. Payoff odds are shown at the bottom of the screen.

If you go broke or want to quit, place a bet of $0. The program then asks you if you want to play again. Push the joystick forward for yes, or pull it back for no, and press the fire-button.

Tony Brantner, a carpenter by trade, is a self-taught computer programmer who says he chose the C-64 because of its "tremendous" graphics potential.

Listing 1. Video Poker program.

```
10 REM VIDEO POKER V1.0 - T. BR
   ANTNER                 :REM*195
20 POKE52,56:POKE56,56:CLR
                          :REM*127
30 DIMDC(51),CA(4),CH(15),HV(5)
   ,HS(4),PO$(9),PO(9) :REM*252
40 FORA=0TO51:DC(A)=A:NEXT:Z=RN
   D(-TI)                  :REM*68
50 V=53248:SC=1024:SP=SC+1016:S
   1=54272                :REM*217
60 S2=S1+7:J2=56320:SX=50:SY=66
   :MB=50                   :REM*5
70 CV$="23456789[JQKA":CS$="{LB
   .}]{UP ARROW}{LEFT ARROW}"
                          :REM*163
80 FORA=1TO38:SP$=SP$+CHR$(32):
   NEXT                   :REM*176
90 FORA=S1TOS1+24:POKEA,0:NEXT
                           :REM*62
100 POKES1+24,15:GOSUB1580
                          :REM*201
110 BT=1:BL=100            :REM*57
120 REM---MAIN             :REM*24
130 FORA=0TO4:CA(A)=0:NEXT
                           :REM*25
140 GOSUB930              :REM*230
150 GOSUB620:IFBT=0THEN260
                          :REM*158
160 GOSUB510              :REM*232
170 CY=1:GOSUB1440:CY=6:GOSUB14
    40                    :REM*174
180 GOSUB930:GOSUB570:CP=0:GOSU
    B390                   :REM*41
190 GOSUB760:GOSUB510:GOSUB390
                          :REM*110
200 GOSUB1000:BL=BL+PO(PV)*BT
                          :REM*251
210 CY=1:A$=PO$(PV):CC=0:REM*81
220 CX=20-LEN(A$):GOSUB1500
                          :REM*169
230 TM=70:GOSUB1400        :REM*43
240 IFBLTHEN130           :REM*254
250 REM---END GAME        :REM*179
260 CY=10:CX=7:CC=0:A$="PLAY AG
    AIN?"                 :REM*120
270 GOSUB1500:CX=31:CC=1:XP=1
                          :REM*139
280 JS=PEEK(J2)            :REM*92
290 IF(JSAND2)=0ANDXP=1THENXP=2
                           :REM*86
300 IF(JSAND1)=0ANDXP=2THENXP=1
                           :REM*85
310 A$=MID$("YN",XP,1):GOSUB150
    0                     :REM*122
320 TM=10:GOSUB1400       :REM*105
330 GOSUB1470:PRINTLEFT$(SP$,2)
                          :REM*176
340 TM=10:GOSUB1400:IF(JSAND16)
    THEN280               :REM*131
350 GOSUB1440             :REM*173
360 IFXP=1THENGOSUB1300:GOTO110
                          :REM*186
370 POKE832,0:SYS832      :REM*106
380 REM---DRAW CARDS       :REM*42
390 FORXP=0TO4            :REM*175
400 IFCA(XP)THEN490         :REM*5
410 A=DC(CP):CS%=A/13:CV%=A-13*
    CS%                   :REM*170
420 HV(XP)=CV%:HS(XP)=CS%
                          :REM*202
430 CY=3:CX=5+XP*7:CC=CS%AND2
                          :REM*237
440 A$=MID$(CV$,CV%+1,1):GOSUB1
    500                   :REM*137
450 CY=4:A$=MID$(CS$,CS%+1,1):G
    OSUB1500              :REM*230
460 POKEV+27,PEEK(V+27)OR2{UP A
    RROW}(XP+1)            :REM*90
470 POKEV+40+XP,1:GOSUB1250:CP=
    CP+1                   :REM*32
480 TM=10:GOSUB1400         :REM*8
490 NEXT:RETURN           :REM*142
500 REM---FACE DOWN       :REM*207
510 FORZ=0TO4             :REM*127
520 IFCA(Z)THEN550         :REM*59
530 POKEV+27,PEEK(V+27)AND255-2
    {UP ARROW}(Z+1)       :REM*187
540 POKEV+40+Z,10         :REM*154
550 NEXT:RETURN           :REM*194
560 REM---SHUFFLE         :REM*159
```

►

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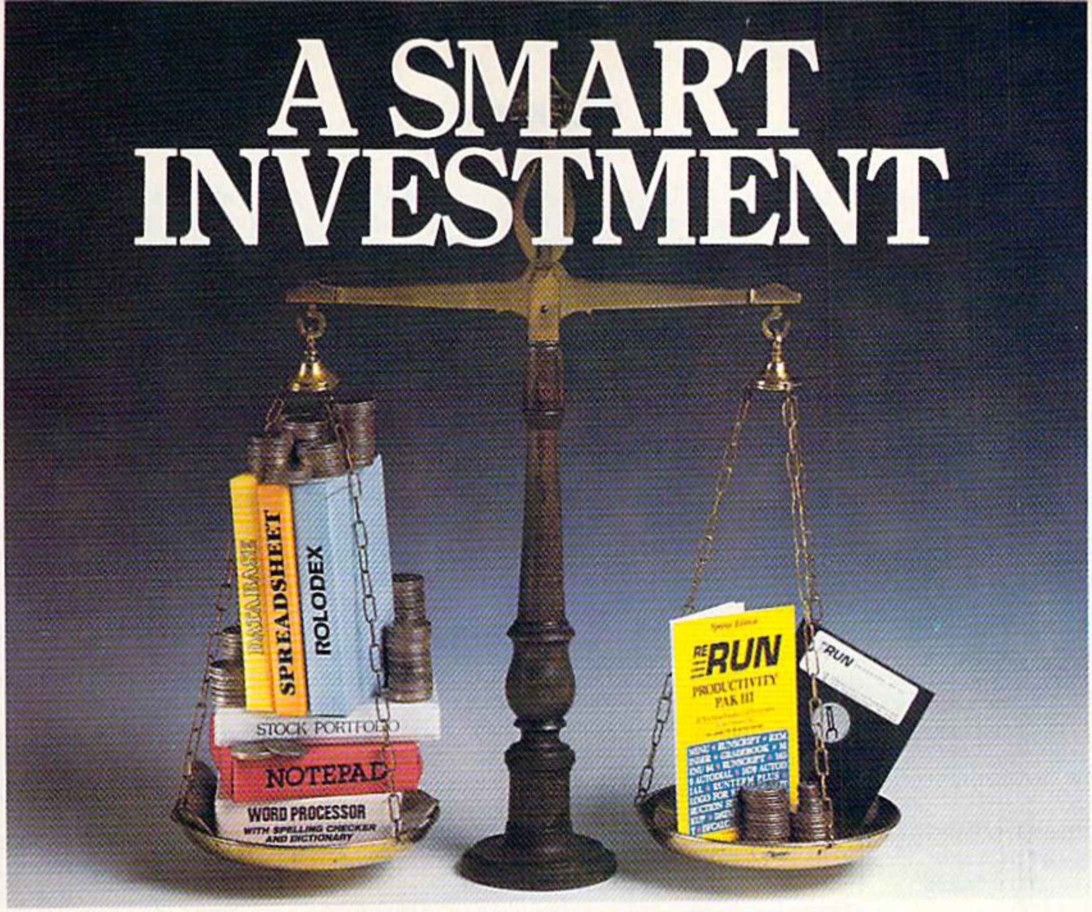

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POKER

```
570 FORA=1TO15:GOSUB1250:NEXT
                           :REM*73
580 FORA=0TO51:Z=INT(RND(1)*52)
                          :REM*225
590 AA=DC(A):DC(A)=DC(Z):DC(Z)=
    AA                    :REM*148
600 NEXT:RETURN           :REM*252
610 REM---PLACE BET       :REM*178
620 CY=10:CX=7:CC=0:A$="PLACE B
    ET"                    :REM*34
630 GOSUB1500:CX=25        :REM*52
640 IFBT<0THENBT=0        :REM*217
650 IFBT>MBTHENBT=MB      :REM*119
660 IFBT>BLTHENBT=BL       :REM*69
670 A=BT:Z=4:GOSUB950      :REM*31
680 JS=PEEK(J2):IF(JSAND16)=0TH
    EN730                 :REM*197
690 IF(JSAND3)<>3THENBT=BT+SGN(
    JSAND2)-SGN(JSAND1):GOTO640
                           :REM*22
700 TM=10:GOSUB1400       :REM*228
710 GOSUB1470:PRINTLEFT$(SP$,8)
                           :REM*66
720 TM=10:GOSUB1400:GOTO640
                          :REM*158
730 GOSUB1300:GOSUB1440:REM*175
740 BL=BL-BT:RETURN        :REM*70
750 REM---HOLD CARDS       :REM*70
760 JX=0:JY=0              :REM*70
770 POKEV+16,32-(JX=4)     :REM*21
780 POKEV,(SX+JX*56)AND255
                           :REM*21
790 POKEV+1,SY+JY*16:TM=4:GOSUB
    1400                   :REM*74
800 POKEV+1,0:TM=4:GOSUB1400
                           :REM*40
810 JS=PEEK(J2):IF(JSAND16)=0TH
    EN880                 :REM*255
820 IF(JSAND2)=0AND(JY=0)THENJY
    =1:GOSUB1350          :REM*212
830 IF(JSAND1)=0AND(JY=1)THENJY
    =0:GOSUB1350          :REM*210
840 IFJYTHENJX=2:GOTO770
                          :REM*227
850 IF(JSAND4)=0AND(JX>0)THENJX
    =JX-1:GOSUB1350        :REM*48
860 IF(JSAND8)=0AND(JX<4)THENJX
    =JX+1:GOSUB1350        :REM*85
870 GOTO770               :REM*199
880 IFJYTHENGOSUB1300:RETURN
                            :REM*9
890 CA(JX)=1-CA(JX):A$=LEFT$(SP
    $,4):IFCA(JX)THENA$=CHR$(15
    2)+"HOLD"             :REM*244
900 CY=6:CX=4+JX*7:GOSUB1470:PR
    INTA$                 :REM*201
910 GOSUB1300:GOTO770     :REM*121
920 REM---PRINT BALANCE:REM*113
930 CY=12:CX=21:Z=6:A=BL
                          :REM*100
940 REM---FORMAT NUMBER:REM*110
950 Z$=STR$(A)            :REM*231
960 A$=LEFT$(SP$,Z-LEN(Z$))+"$"
    +RIGHT$(Z$,LEN(Z$)-1)
                          :REM*221
970 CC=1:GOSUB1500        :REM*126
980 RETURN                :REM*102
990 REM---EVALUATE HAND:REM*196
1000 SV=0:SR=0:FL=0:CT=0:PV=0:H
     V(5)=99              :REM*255
1010 FORA=3TO0STEP-1:FORZ=0TOA
                            :REM*5
1020 IFHV(Z)<HV(Z+1)THENAA=HV(Z
     ):HV(Z)=HV(Z+1):HV(Z+1)=AA
                          :REM*111
1030 NEXT:NEXT            :REM*132
1040 FORA=0TO4:FORZ=0TO4:REM*93
1050 IFHV(Z)=HV(A)THENSV=SV+1
                          :REM*121
1060 NEXT:NEXT            :REM*166
1070 FORA=0TO4            :REM*127
1080 CT=CT+HV(A)           :REM*90
1090 IFHV(A)=HV(A+1)+1THENSR=SR
     +1                   :REM*110
1100 IFHS(A)=HS(0)THENFL=FL+1
                          :REM*108
1110 NEXT                 :REM*220
1120 REM---POINT VALUE     :REM*60
1130 IFSV=7THENPV=1       :REM*117
1140 IFSV=9THENPV=2       :REM*151
1150 IFSV=11THENPV=3      :REM*206
1160 IF(SR=4)OR(HV(0)=12ANDSR=3
     ANDCT=18)THENPV=4 :REM*201
1170 IFFL=5THENPV=5       :REM*103
1180 IFSV=13THENPV=6        :REM*4
1190 IFSV=17THENPV=7       :REM*87
1200 IFFL<5THENRETURN      :REM*94
1210 IF(SR=4)OR(HV(0)=12ANDSR=3
     ANDCT=18)THENPV=8      :REM*3
1220 IFHV(0)=12ANDSR=4THENPV=9
                          :REM*190
1230 RETURN                :REM*89
1240 REM---CARD SOUND     :REM*237
1250 POKES1,0:POKES1+1,200
                          :REM*205
1260 POKES1+5,48:POKES1+6,0
                          :REM*181
1270 POKES1+4,128:POKES1+4,129
                          :REM*170
1280 RETURN               :REM*139
1290 REM---BEEP SOUND      :REM*34
1300 POKES2,0:POKES2+1,12
                           :REM*68
1310 POKES2+5,8:POKES2+6,240
                            :REM*1
1320 POKES2+4,17:TM=6:GOSUB1400
                           :REM*99
1330 POKES2+4,16:WAITJ2,16:RETU
     RN                    :REM*23
1340 REM---CURSOR SOUND:REM*125
1350 POKES1,0:POKES1+1,10
                           :REM*82
1360 POKES1+5,2:POKES1+6,0
                          :REM*180
1370 POKES1+4,16:POKES1+4,17
                           :REM*70
1380 RETURN               :REM*247
1390 REM---DELAY          :REM*208
1400 TM=TM+TI             :REM*206
1410 IFTM>TITHEN1410      :REM*184
1420 RETURN                :REM*28
1430 REM---CLEAR LINE     :REM*252
1440 POKE214,CY-1:PRINT:PRINTSP
     $                    :REM*136
1450 RETURN                :REM*62
1460 REM---PLOT           :REM*246
1470 POKE214,CY-1:PRINT:PRINTTA
     B(CX);               :REM*212
1480 RETURN                :REM*80
1490 REM---PRINT WIDE STRING
                            :REM*1
1500 SL=SC+CY*40+CX        :REM*74
1510 FORA=1TOLEN(A$)      :REM*144
1520 Z=(ASC(MID$(A$,A,1))AND63)
     *2                   :REM*197
1530 POKESL+S1,CC:POKESL+S1+1,C
     C                    :REM*245
1540 POKESL,Z+128:POKESL+1,Z+12
     9                     :REM*85
1550 SL=SL+2               :REM*32
1560 NEXT:RETURN          :REM*176
1570 REM---REDEFINED CHARACTERS
                          :REM*209
1580 POKE53281,5:POKE53280,5
                          :REM*218
1590 PRINTCHR$(8)CHR$(147):POKE
     V+21,0               :REM*162
1600 CY=12:CX=14:GOSUB1470
                          :REM*172
1610 PRINTCHR$(144)"SETTING UP.
     .."                   :REM*30
1620 POKE56334,PEEK(56334)AND25
     4                     :REM*36
1630 POKE1,PEEK(1)AND251:REM*78
1640 POKE781,5:POKE782,1:POKE91
     ,212:POKE90,0:POKE89,60:PO
     KE88,0               :REM*159
1650 SYS41964              :REM*62
1660 POKE1,PEEK(1)OR4  :REM*119
1670 POKE56334,PEEK(56334)OR1
                          :REM*135
1680 POKE53272,(PEEK(53272)AND2
     40)OR14              :REM*103
1690 FORA=0TO15:READCH(A):NEXT
                           :REM*89
1700 N1=14336:N2=N1+1024:N3=N2+
     8                    :REM*140
1710 FORA=0TO63:FORZ=0TO7
                           :REM*82
1720 CN=PEEK(N1+A*8+Z):AA=CH((C
     NAND240)/16):ZZ=CH(CNAND15
     )                     :REM*47
1730 POKEN2+A*16+Z,AA:POKEN3+A*
     16+Z,ZZ              :REM*129
1740 NEXT:NEXT             :REM*65
1750 FORA=0TO79:READZ:POKEN2+43
     2+A,Z                :REM*102
1760 NEXT                 :REM*101
1770 REM---SPRITES         :REM*80
1780 FORA=832TO959:READZ:POKEA,
     Z:NEXT               :REM*238
1790 POKEV+23,127:POKEV+29,127
                          :REM*198
1800 POKEV+27,65:POKEV+28,127
                           :REM*96
1810 POKEV+37,1:POKEV+38,0
                          :REM*228
1820 FORA=0TO4:POKEV+40+A,10
                          :REM*225
1830 POKEV+2+A*2,(SX+A*56)AND25
     5                    :REM*170
1840 POKEV+3+A*2,SY:POKESP+1+A,
     13                    :REM*79
1850 NEXT:POKEV+16,32      :REM*72
1860 POKEV+12,SX+112:POKEV+13,S
     Y+16                  :REM*21
1870 POKESP+6,14:POKEV+45,0
```

```
                              :REM*199
1880 POKESP,14:POKEV+1,0:POKEV+
     39,7                      :REM*39
1890 REM---SCREEN             :REM*128
1900 PRINTCHR$(147):POKEV+21,12
     7                        :REM*216
1910 CY=8:CX=18:GOSUB1470
                              :REM*176
1920 PRINTCHR$(152)"DRAW"
                              :REM*101
1930 CY=12:CX=7:A$="BALANCE":CC
     =0                       :REM*189
1940 GOSUB1500                :REM*216
1950 CY=14:CX=8:CC=7:A$="***PAY
     OFF***"                  :REM*247
1960 GOSUB1500                :REM*236
1970 POKE214,CY:PRINT:POKE646,0
                              :REM*191
1980 PO$(0)="NO COMBINATION":PO
     (0)=0                     :REM*21
1990 FORA=1TO9:READPO$(A),PO(A)
                              :REM*190
2000 PRINT:PRINTTAB(8)PO$(A);
                              :REM*106
2010 IFPO(A)=1THENPRINTTAB(28)"
     EVEN";:GOTO2030          :REM*251
2020 PRINTTAB(27-(LEN(STR$(PO(A
     )))));PO(A);"TO 1";:REM*77
2030 NEXT:CC=13               :REM*174
2040 FORXP=1TO7:CY=10+XP*2
                              :REM*211
2050 A$=MID$("$POKER$",XP,1)
                               :REM*90
2060 CX=3:GOSUB1500:CX=35:GOSUB
     1500                     :REM*208
2070 NEXT:RETURN              :REM*188
2080 REM---GRAPHICS DATA
                              :REM*210
2090 DATA 0,3,12,15,48,51,60,63
     ,192,195,204,207,240,243,2
     52,255,113,243            :REM*12
2100 DATA 115,115,115,115,249,0
     ,254,135,135,135,135,135,2
     54,0,1,3,7,15,31         :REM*213
2110 DATA 63,29,1,128,192,224,2
     40,248,252,184,128,3,7,3,2
     9,63,63,29,1,192         :REM*113
2120 DATA 224,192,184,252,252,1
     84,128,30,63,63,31,15,7,3,
     1,120,252,252            :REM*138
2130 DATA 248,240,224,192,128,1
     ,3,15,63,15,3,1,0,128,192,
     240,252,240,192          :REM*245
2140 DATA 128,0,0,0,0,85,85,84,
     106,170,164,102,102,100,10
     5,153,164,102            :REM*226
2150 DATA 102,100,105,153,164,1
     02,102,100,105,153,164,102
     ,102,100,105,153         :REM*228
2160 DATA 164,102,102,100,106,1
     70,164,85,85,84,0,0,0,255,
     255,252,255,255           :REM*72
2170 DATA 252,255,255,252,255,2
     55,252,255,255,252,255,255
     ,252,0,0,0,0,0,0         :REM*215
2180 DATA 0,0,0,0,0,0,0,0,0,0,0
     ,0,0,0,0,0,0,0,0,0,0,0,0,0
     ,0,0,0,0,0,0,0,0         :REM*165
2190 DATA 0,0,0,0,0,0,0,0,170,1
     70,168,170,170,168,170,170
     ,168,170,170,168         :REM*111
2200 DATA 170,170,168,170,170,1
     68,0                     :REM*247
2210 REM---PAYOFF DATA :REM*154
2220 DATA"ONE PAIR",1  :REM*172
2230 DATA"TWO PAIR",2   :REM*51
2240 DATA"THREE OF A KIND",3
                              :REM*142
2250 DATA"STRAIGHT",4   :REM*52
2260 DATA"FLUSH",6     :REM*253
2270 DATA"FULL HOUSE",10:REM*63
2280 DATA"FOUR OF A KIND",25
                               :REM*70
2290 DATA"STRAIGHT FLUSH",50
                              :REM*133
2300 DATA"ROYAL FLUSH",200
                              :REM*60 ■
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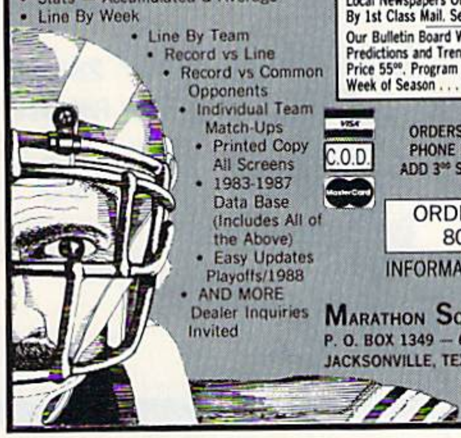

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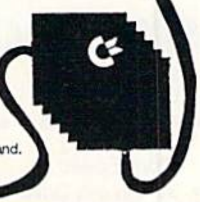

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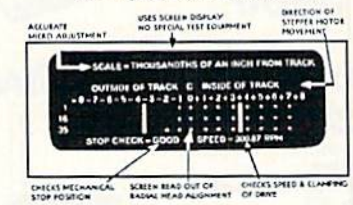
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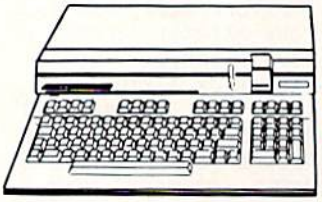

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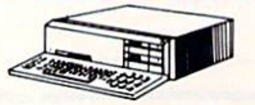

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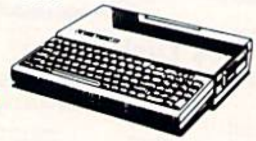

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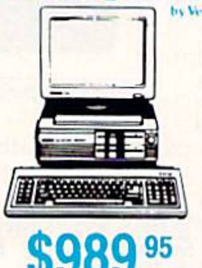

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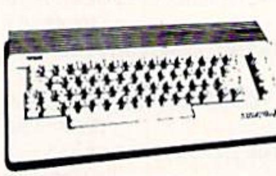

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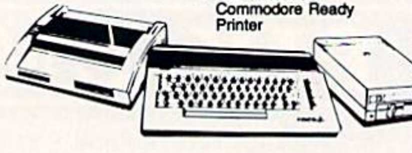

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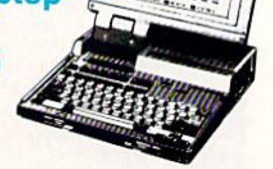

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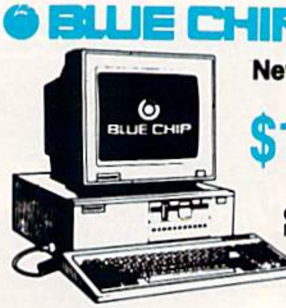

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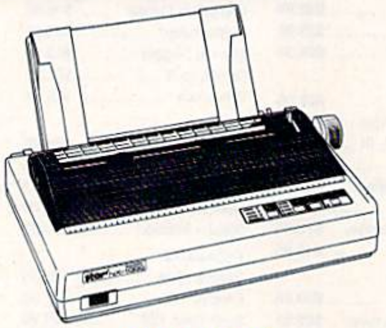

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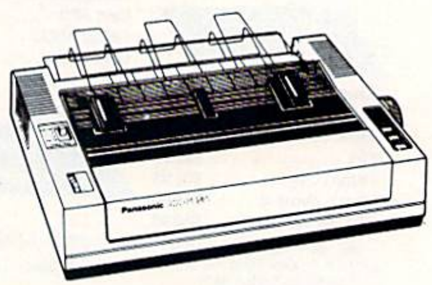

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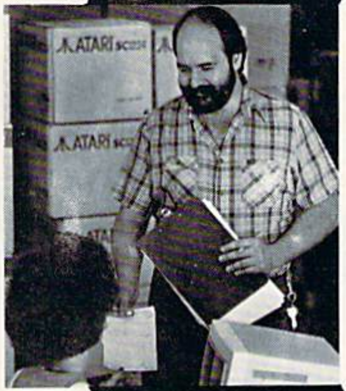

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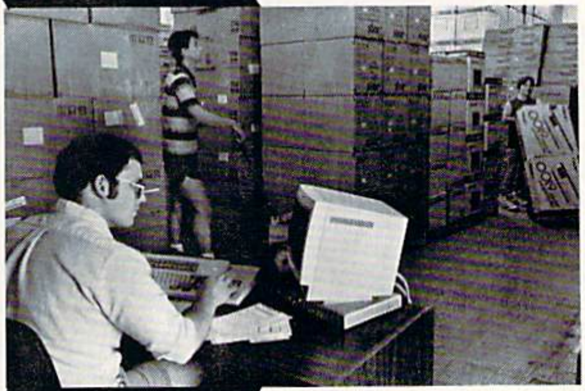

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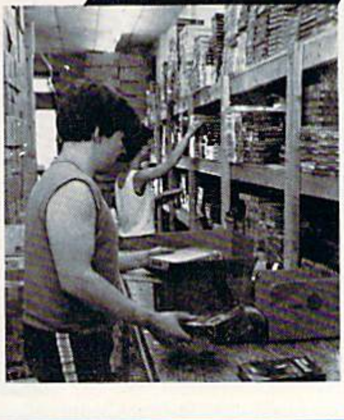

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Disk File Helper

Now you can take advantage of some 1541 and 1571 file-handling commands that Commodore overlooked.

◇

By BOB KODADEK

Disk File Helper is a utility that reprograms the 1541/1571 disk drive's operating system (DOS) to let you lock, unlock and unscratch files and change filetypes. It works with program (PRG), sequential (SEQ) and user (USR) files, and is much faster than using the usual track and sector editor, which spends time transferring blocks of directory data back and forth between the disk drive and the computer. In fact, Disk File Helper reduces the time for these operations to under one second!

FILETYPE PRIMER

Actually, PRG, SEQ and USR files are all sequential, differing only in manner of access and normal use. PRG files load directly into memory, so are most often used to store Basic and machine language programs. SEQ files, which must be read from beginning to end, are used for data and text files, such as those generated by databases and word processors. USR files are similar to SEQ files, but their contents are ordinarily arranged in special formats for unusual applications.

The value stored in the filetype byte, which is the first byte in the directory entry, specifies the type (0–4) for all properly closed files. Table 1 lists these values in binary, hex and decimal for various types of files. Note that direct-access-type random files don't appear in the directory.

USING THE PROGRAM

Type in Listing 1, using *RUN*'s Checksum program, and save it to disk. Then, whenever you need the assistance of Disk File Helper, just load and run it. The program's menu is shown in Table 2.

Option 1 lists the disk directory to the screen. To freeze and unfreeze the scrolling, press and release the space bar. ►

RUN it right: **C-64 or C-128 in 40- or 80-Column mode; 1541 or 1571 disk drive.**

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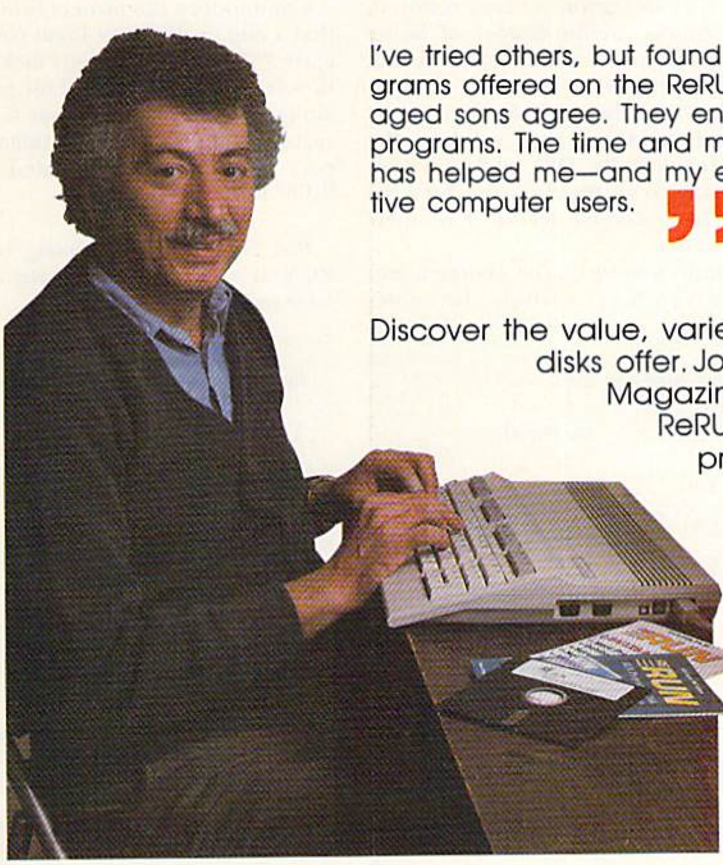

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Option 2 prompts you to enter the name of the file whose type you want to change, then displays a menu offering a choice of SEQ, PRG or USR. Being able to change the filetype is especially handy for loading SEQ and USR files into a monitor program for examination, since these files can't be loaded with the Load command.

Option 3 lets you unscratch, or restore, files you've inadvertently deleted from your disk directory, as long as you do it before another write or save operation to the disk. Just enter the name of the file, followed by the filetype you want it to have. It's possible to restore files, because scratching a file doesn't actually erase the data; it merely frees up the blocks reserved for that file in the block allocation map (BAM). Once scratched, and prior to being restored, those blocks are in danger of being overwritten and the file data destroyed. Unscratching with Disk File Helper changes the filetype byte back to its original status and then validates the disk. Incidentally, DEL (deleted) files don't appear in the disk directory, because DOS doesn't set bit 7 of their filetype byte.

To unlock or lock a file, choose menu option 4 or 5, respectively, then enter the filename at the prompt. Locking a file offers valuable protection from alteration and erasure, so it's surprising Commodore left it out.

Commodore 128 owners should note that a bug in the Burst Load routine in early 1571 ROMs prevents locked PRG files from being loaded. This problem, along with many others, has been corrected in the latest ROM release. The part number of the updated chip is 310654-04. R

Bob Kodadek, a contributing editor for RUN, *is a computer programmer and freelance writer.*

Table 1. Contents of the filetype byte for various kinds of files.

Type	Binary	Hex	Decimal
0 DEL (deleted)	10000000	$80	128
1 SEQ (sequential)	10000001	$81	129
2 PRG (program)	10000010	$82	130
3 USR (user)	10000011	$83	131
4 REL (relative)	10000100	$84	132

Table 2. Disk File Helper menu.

1. View the directory
2. Change the filetype
3. Unscratch a file
4. Unlock a file
5. Lock a file
6. Quit

Listing 1. Disk File Helper program.

```
10 REM TURBO FILE HELP 64/128 -
    BOB KODADEK (C) 1988
                         :REM*132
20 SA=4864:KP=212:IF PEEK(40960
   ) THEN SA=49152:KP=197
                         :REM*168
30 C$=",":D$=CHR$(13):CL$=CHR$(
   157)+CHR$(157)+CHR$(157)
                          :REM*82
40 DC=SA+102:PRINT"READING DATA
   ...."                   :REM*0
50 FOR I=0 TO 263        :REM*134
60 READ BY                :REM*80
70 POKE SA+I,BY          :REM*242
80 CK=CK+BY               :REM*90
90 NEXT I                :REM*111
100 IF CK<>33218 THEN PRINT "DA
    TA ERROR!":END        :REM*39
110 H=INT(DC/256):L=DC-(H*256):
    POKE SA+1,L:POKE SA+5,H
                         :REM*164
120 PRINT CHR$(147) D$"TURBO FI
    LE HELP 64/128"      :REM*154
130 PRINT D$ " (C) 1988 BOB KOD
    ADEK" D$             :REM*155
140 PRINT D$ SPC(6) CHR$(18)"FU
    NCTION MENU" D$      :REM*128
150 PRINT SPC(3)"1. VIEW DIRECT
    ORY"                 :REM*223
160 PRINT SPC(3)"2. CHANGE FILE
    TYPE"                :REM*199
170 PRINT SPC(3)"3. UN-SCRATCH
    FILE"                :REM*176
180 PRINT SPC(3)"4. UNLOCK A FI
    LE"                   :REM*85
190 PRINT SPC(3)"5. LOCK A FILE
    "                    :REM*166
200 PRINT SPC(3)"6. QUIT" D$
                         :REM*250
210 PRINT"WHICH FUNCTION (1-6){
    2 SPACEs}1" CL$;:INPUT A$
                         :REM*163
220 K=VAL(A$):IF K <1 OR K >6 T
    HEN 120               :REM*81
230 IF K=6 THEN END       :REM*51
240 PRINT D$ "DRIVE UNIT? 8" CL
    $;:INPUT U           :REM*162
250 IF U<8 OR U>15 THEN 120
                          :REM*27
260 OPEN 1,U,15:CLOSE 1:DR=ST
                         :REM*115
270 IF DR=0 THEN 300      :REM*65
280 PRINT D$ "STATUS: DEVICE NO
    T PRESENT!" D$        :REM*77
290 GOSUB 630:GOTO 120 :REM*111
300 LF=0:FT=0:POKE DC+49,240
                          :REM*70
310 ON K GOSUB 340,460,510,540,
    530                   :REM*73
320 GOTO 120             :REM*130
330 REM DIRECTORY        :REM*157
340 PRINT CHR$(147)       :REM*44
350 OPEN 1,U,15:OPEN 2,U,0,"$0"
                         :REM*233
360 GOSUB 650:IF EN <> 0 THEN 4
    30                   :REM*229
370 N$=CHR$(0):GET#2,A$,A$
                         :REM*190
380 GET#2,A$,A$:IF A$="" THEN 4
    30                   :REM*190
390 IF PEEK (KP)=60 THEN 390
                         :REM*205
400 GET#2,A$,B$:PRINT ASC(A$+N$
    )+ASC(B$+N$)*256;  :REM*118
410 GET#2,A$:IFA$=""THEN PRINT:
    GOTO 380             :REM*143
420 PRINTA$;:GOTO 410     :REM*30
430 CLOSE 2:GOSUB 610     :REM*17
440 RETURN                :REM*68
450 REM CHANGE FILETYPE:REM*115
460 GOSUB 660:IF FL=0 THEN 630
                         :REM*192
470 GOSUB 700:IF FT$="0" THEN 6
    30                    :REM*78
480 FT=128+VAL(FT$):GOSUB 560
                         :REM*201
490 RETURN               :REM*122
500 REM UN-SCRATCH FILE :REM*56
510 POKE DC+49,208:GOTO 460
                         :REM*254
520 REM UNLOCK/LOCK FILE:REM*92
530 LF=128                 :REM*6
540 GOSUB 660:IF FL=0 THEN 630
                          :REM*23
550 GOSUB 560:RETURN     :REM*253
560 SYS SA                :REM*51
570 CLOSE 1:OPEN 1,U,15:REM*238
580 PRINT#1,"M-W"CHR$(143)CHR$(
    5)CHR$(FL+2)CHR$(FT)CHR$(LF
    ) F$                    :REM*241
590 PRINT#1,"U3":GOSUB 650
                            :REM*144
600 IF EN <> 0 THEN 610:REM*135
610 PRINT D$ "STATUS: "EN$;C$;E
    M$;C$;ET$;C$;ES$ D$ :REM*57
620 IF K=3 THEN PRINT"WORKING..
    ." D$:PRINT#1,"V0:":REM*130
630 CLOSE 1:PRINT"PRESS <RETURN
    >";:SYS 65487           :REM*202
640 RETURN                   :REM*13
650 INPUT#1,EN$,EM$,ET$,ES$:EN=
    VAL(EN$):RETURN         :REM*164
660 PRINT CHR$(147) D$:F$=""
                            :REM*130
670 INPUT"ENTER FILENAME";F$:FL
    =LEN(F$)                :REM*164
680 PRINT:IF FL=0 THEN PRINT"ST
    ATUS: 34,SYNTAX ERROR,00,00
    " D$                    :REM*179
690 RETURN                   :REM*67
700 PRINT D$ "SELECT FILETYPE W
    ANTED ON THIS FILE" D$
                            :REM*239
710 PRINT"{3 SPACEs}1. SEQ"
                             :REM*40
720 PRINT"{3 SPACEs}2. PRG"
                             :REM*87
730 PRINT"{3 SPACEs}3. USR" D$
                            :REM*105
740 PRINT"ENTER (1-3){2 SPACEs}
    2" CL$;:INPUT FT$        :REM*52
750 IF FT$>"0" AND FT$<"4" THEN
     RETURN                 :REM*172
760 PRINT D$ "STATUS: 64,FILETY
    PE MISMATCH,00,00" D$
                             :REM*37
770 FT$="0":RETURN          :REM*186
780 DATA 169,102,133,251,169,19
    ,133,252,169,0,133,253,169,
    5,133,254,165           :REM*117
790 DATA 186,32,177,255,169,111
    ,32,147,255,169,77,32,168,2
    55,169,45,32            :REM*176
800 DATA 168,255,169,87,32,168,
    255,165,253,32,168,255,165,
    254,32,168,255          :REM*101
810 DATA 169,32,32,168,255,160,
    0,177,251,201,255,240,34,32
    ,168,255,200            :REM*172
820 DATA 192,32,144,242,165,251
    ,105,31,133,251,165,252,105
    ,0,133,252,24            :REM*58
830 DATA 165,253,105,32,133,253
    ,32,174,255,162,0,240,174,3
    2,174,255,96            :REM*189
840 DATA 32,0,193,169,18,160,1,
    133,6,132,7,169,176,32,125,
    5,201,1,208,9            :REM*45
850 DATA 169,128,32,125,5,201,1
    ,240,6,24,105,24,76,200,193
    ,169,3,133,60           :REM*159
860 DATA 162,0,134,75,240,30,16
    0,0,177,59,240,16,200,200,2
    00,185,142,5            :REM*115
870 DATA 209,59,208,6,192,18,24
    0,32,208,242,230,75,166,75,
    224,8,240,7              :REM*34
880 DATA 189,135,5,133,59,208,2
    19,173,0,3,240,6,172,1,3,76
    ,7,5,88,76,69            :REM*53
890 DATA 217,160,0,173,143,5,20
    8,11,177,59,41,191,174,144,
    5,240,2,9,64            :REM*250
900 DATA 145,59,169,144,32,125,
    5,76,158,193,133,0,88,36,0,
    48,252,165,0            :REM*105
910 DATA 96,2,34,66,98,130,162,
    194,226,0,0,160,160,160,160
    ,160,160,160            :REM*177
920 DATA 160,160,160,160,160,16
    0,160,160,160,255  :REM*147
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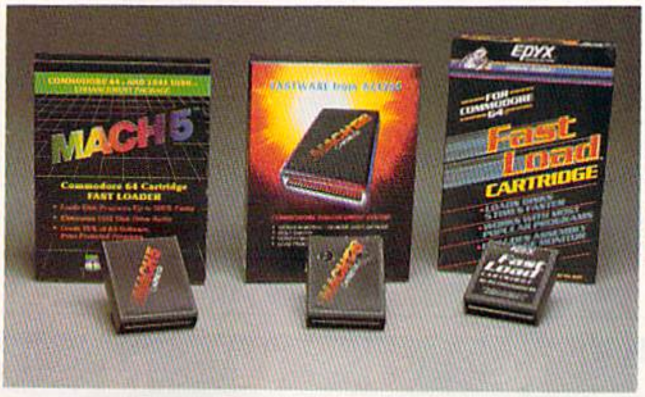
Rapid Transit Systems

Experience life in the Commodore fast lane with a speed-up cartridge or a ROM replacement.

◇

By RAY ROBERTS



A sampling of the fast-load cartridges available for you to plug into your Commodore's expansion port.

The C-64's many excellent features have made it one of the most popular computers in history; and, of course, the 1541 disk drive is the mass storage device most often used with it. Virtually all commercial software for the C-64 is now available on 1541-format disks.

Frankly, though, the disk operating system (DOS) leaves much to be desired. Among other things, the transfer of data between the 1541 and the computer is abysmally slow when compared to other computer systems—a result of inefficient communications software routines built into the 1541 DOS ROM and the C-64 Kernal ROM.

Fortunately, there are ways to speed up the system. One method is to use a fast-load program, such as Sizzle (*RUN*, December 1987), that can be tucked away in computer memory. The primary disadvantage of this approach is that, sooner or later, you'll load a program that uses the same memory area as the fast-loader. Then you'll have to find a different memory location for the latter (if you can).

A second solution is a cartridge that plugs into the expansion port. The software in such cartridges usually doesn't occupy much of the normal RAM in the computer, so most programs can be loaded and operated without conflict. Most fast-load cartridges offer many other features as well, such as fast-saving, easy-to-use DOS commands, a screen-dump utility, programming aids, a machine language monitor, preprogrammed function keys and archival backup. Fast-load cartridges do tie up the expansion port, but some of them have so many features that you may have to remove the cartridge only rarely.

The third solution to the speed problem is to actually replace the ROM chips in the computer and disk drive with improved versions thereof. Some of these ROM replacements produce nearly incredible fast-loading and -saving.

The biggest drawback to ROM replacement is that installation requires opening the computer and disk drive to remove the old chips and insert the new ones. This isn't too difficult if you're one of the lucky ones to have a socketed Kernal ROM in your C-64, but, if you don't, first you'll need to install a 24-pin IC socket (which can be rather nerve-racking). If you're thinking about going the ROM-replacement route, you should first determine whether your Kernal ROM is socketed, so you'll know what you're getting into ahead of time. (Don't forget that if your computer is still under warranty, opening its case could void the warranty.)

In this article, I'll survey six fast-load cartridges and four ROM-replacement products. I hope the information helps you find a product that suits your needs. Table 1 presents a comparison of loading and saving times. Table 2 is a list of manufacturers and prices.

FAST-LOAD CARTRIDGES

The inexpensive **FastLoad Cartridge**, from Epyx, has been a best-seller for a couple of years. This product's features include fast-loading, a DOS wedge and a machine language monitor. Pressing the British pound (£) key allows you to select disk utilities, including file copying, disk duplication, file renaming, disk formatting and file locking. The Epyx cartridge even offers a rudimentary disk editor. The documentation comes in a well-written, 12-page instruction manual.

Another popular and inexpensive cartridge is Access Software's **Mach 5**, also with fast-loading and a built-in DOS wedge. I found the Mach 5 a little hard to get used to, because some of the DOS commands are defined differently than in the DOS 5.1 utility that comes with every new 1541. However, you can easily obtain a full-screen display of all the commands by pressing the left arrow and then M (for menu). The Mach 5 also includes simple two-keystroke commands for opening and closing a printer channel, making hex/decimal conversions and disabling the 1541 drive rattle. It doesn't provide a machine language monitor.

The **Mach 128** cartridge, also a product of Access Software, provides fast-loading in 64 mode and the same DOS commands as the Mach 5 in both C-64 and C-128 modes. If you've graduated to the C-128 and miss the familiar and easy DOS 5.1 commands, this cartridge may make the transition between computers easier. One simple but nice fea-

PHOTOGRAPHED BY LARRY DUNN

ture of the Mach 128 is that it prints colons after the filenames when you display a directory by pressing $. Then, to run a program in 128 mode, all you have to do is move the cursor up to the filename and press the F6 key!

The Soft Group's **Explode!** cartridge provides fast-loading and the standard DOS commands, plus graphics capture and manipulation capabilities. While a program is running, you can capture, save to disk and print any hi-res or text screen, at the touch of a button. If you get the cartridge with the disable switch ($5 extra), you can use it to capture hi-res screens on the 40-column C-128 screen. This cartridge can also convert nonstandard hi-res and text screens into standard Koala and Doodle! pictures and strip the color from a picture (positive or negative). It's even possible to save and print sprite images by using a machine language monitor to overlay the sprite image on the captured picture.

The Explode! documentation comes on a disk in seven separate files that can be printed with a sequential file reader that's also on the disk (total, 13 pages). Unfortunately, the separate files make the printing complicated and slow. The documentation also appears to have been written at the last moment; it's disjointed and confusing. It even ends with the comment, "Well, it's 2:30 AM..." I hope The Soft Group will improve the documentation, because otherwise Explode! is a good product.

The **Final Cartridge III**, from H&P Computers, provides fast-loading, fast-saving and DOS commands. It's the only cartridge I reviewed that has fast-saving capability. It also offers a multitude of other features, including programming aids (30 new Direct-mode commands and improved screen editing), programmed function keys, a powerful machine language monitor, a notepad, a calculator and an alarm clock. What a terrific environment for Basic and assembly language programming! There's also a "freezer" option, with which you can disable sprite detection in games, autofire the joystick and make archival copies of programs by saving from memory to a disk.

The Final Cartridge III has a user interface similar to GEOS and the Amiga, with windows and drop-down menus, and it's easiest to operate with a joystick or a mouse. The 57 pages of documentation are well-written.

I had one significant problem with this cartridge: I couldn't save programs with the DSave command on either a C-128/1571 (new ROM) combination or a stock C-64 and 1541. In both cases, it would save a few blocks and then stop. I can't explain the failure, but I hesitate to fault the cartridge software; there may have been a bad contact.

The **Super Snapshot**, another high-powered cartridge for the C-64, comes from Software Support International. It includes a fast-loader, DOS wedge, screen dump utility, machine language monitor, utility menu, preprogrammed function keys and an excellent archiver utility that works by saving the program directly from memory to disk (the "snapshot").

If you're a QuantumLink user, you'll like this cartridge because it lets you perform disk operations while online by just pressing the button on the cartridge and selecting the utilities option. Super Snapshot comes with a well-written, 25-page instruction manual.

Just recently, I spotted an ad from Software Support for Super Snapshot V3.0. The price appears unchanged, but this product offers some new features, including fast-saving, graphics screen dumps, a file copier and a disk copier.

ROM REPLACEMENTS

1541 Flash!, from Skyles Electric Works, was one of the first ROM replacement products available (copyright 1984) for the C-64/1541 combination. ►

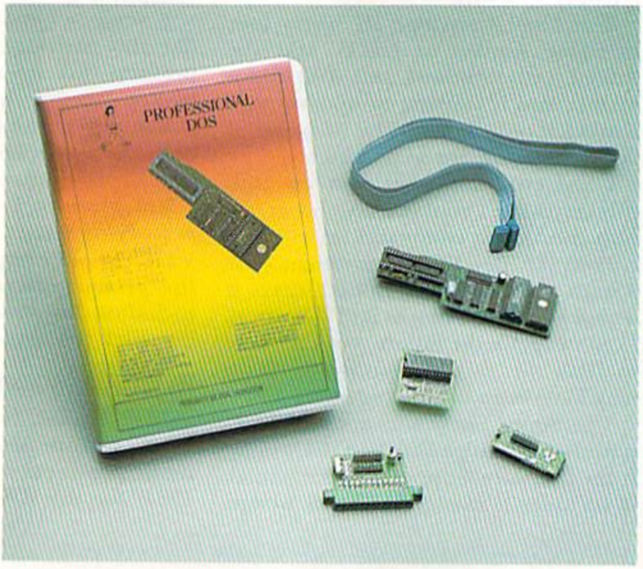
Table 1. Load and save times (130 disk blocks), in seconds.

FAST-LOAD CARTRIDGES:	LOAD	SAVE
C-64, unembellished	83	88
Epyx FastLoad	17	88
Explode!	12	88
Final Cartridge III	10	*
Mach 5	17	88
Mach 128	17	88
Super Snapshot	15	88
ROM REPLACEMENTS:		
1541 Flash!	21	72
JiffyDOS/64	9	37
RapiDOS	11	68
RapiDOS Professional	3	6

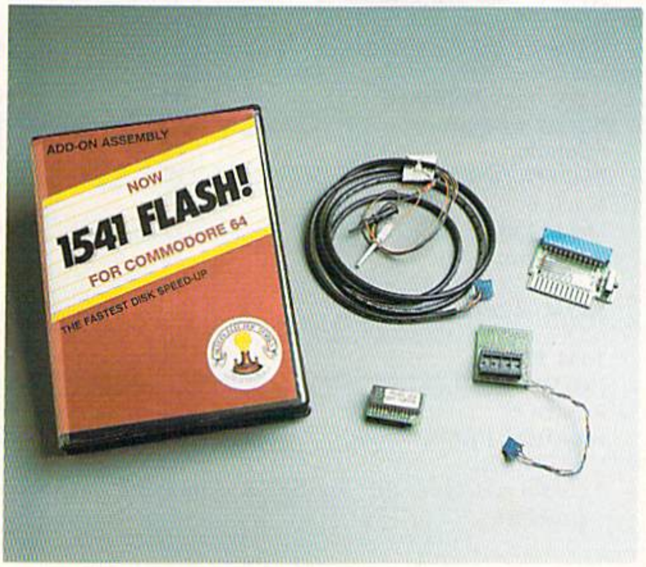
* Could not save with the DSave command; possibly an equipment problem.

SUPER SNAPSHOT
EXPLODE! V3.0
HYPER LOAD
CONVERT!

You must decide whether a fast-load cartridge or a ROM replacement is best for your needs.



RapiDOS Professional is an example of one of the most recent ROM replacement products.



1541 Flash!, one of the earliest available ROM replacement products.

Replacing the C-64 Kernal ROM and the 1541 DOS ROM, it speeds up program loading and slightly decreases saving time, has a built-in DOS wedge and adds some editing commands. Besides the ROMs, the hardware includes a pass-through cable card that plugs into the user port and a cable that connects it to the 1541 with two microclips and a ground wire. Installation instructions are detailed and include good pictures.

I found **JiffyDOS/64**, from Creative Micro Designs, the simplest to install of the four ROM replacements I tested. All I had to do was replace the C-64 Kernal ROM and the 1541 DOS ROM with small JiffyDOS ROM-adapter board assemblies, which plug easily into the ROM sockets, and mount a JiffyDOS-disable toggle switch on the side of the computer and the disk drive. There are no extra cables going to the disk drive or additional circuit boards occupying any peripheral ports on the computer. If it weren't for the JiffyDOS opening screen and the small toggle switches on the computer and drive, you'd never know your C-64 was modified.

JiffyDOS's performance was impressive. Programs that I'd saved when it was active (interleave of 6) loaded more than nine times faster than normal, and programs were saved in less than half the normal time. Even reading and writing sequential and relative files was faster. JiffyDOS can really add zip to a word processor or database manager!

The DOS wedge provides all the standard commands, plus 15 new ones that include Disable Head Rattle, List Basic Program from Disk, Enable/Disable Function Key Definitions, Change Disk Interleave, Lock/Unlock File, List ASCII Text File, Un-New, Screen Dump (text) and more.

The 50 pages of documentation are excellent. The creator of JiffyDOS is also a science writer, and his training and experience show.

There's no machine language monitor in the JiffyDOS ROM, but JiffyMON, one of the fullest-featured monitors I've seen (with excellent documentation), is included in the package on a disk.

Since JiffyDOS/64 doesn't occupy any ports on the computer, it's hardware-compatible with all computer peripherals, and you can't beat Creative Micro Designs' 30-day, money-back compatibility guarantee, which entitles you to a complete refund if you're dissatisfied because of any software-compatibility problems.

The firm tells me that JiffyDOS/128 is under development and will provide disk-access speedups in 64, 128 and

CP/M modes on the C-128. It should be available by the time you read this.

Table 2. Manufacturers and prices.

FAST-LOAD CARTRIDGES:

FastLoad
Epyx
PO Box 8020
Redwood City, CA 94063
$25

Explode!
The Soft Group
PO Box 111
Montgomery, IL 60538
$29.95

Final Cartridge III
H&P Computers
154 Valley St.
South Orange, NJ 07079
$69.95

Mach 5 and **Mach 128**
Access Software
2561 South 1560 West
Woods Cross, UT 84087
$25 and $35

Super Snapshot
Software Support International
2700 NE Andresen Rd.
Vancouver, WA 98661
$54.95

ROM REPLACEMENTS:

1541 Flash!
Skyles Electric Works, Inc.
231-E South Whisman Rd.
Mountain View, CA 94041
$69.95

JiffyDOS/64 and **JiffyDOS/128**
Creative Micro Designs
PO Box 789
Wilbraham, MA 01095
$49.95 and $59.95

RapiDOS and
RapiDOS Professional
Burst-ROM and **Burst-ROM 128**
Chip Level Designs
PO Box 603
Astoria, OR 97103
RapiDOSs: $49.95 and $99.95
Burst-ROMs: $32.95 and $38.95

RapiDOS, by Chip Level Designs, consists of two ROM adapter boards, a user-port connector, a board mounted on top of a 6522 chip in the disk drive and a 3½-foot length of ribbon cable. The "preliminary manual" offered reasonably good installation instructions; its computer-generated drawings were sufficiently detailed to prevent any problems. However, the adapter boards were too large to allow replacement of the RF shield in both the computer and the disk drive, so you might expect more TV interference from your computer system after installation of RapiDOS.

In my tests, loading times decreased by a factor of up to 7½ and saving times were reduced by about 25 percent with RapiDOS. It also offers a limited DOS wedge, improved editing features, preprogrammed function keys, a screen dump (text), hex/decimal conversion and a simple machine language monitor.

One major drawback to RapiDOS is that the user port is occupied and any attempt to access device 2 (modem or RS-232) will give an Illegal Device error. It therefore appears that any computer outfitted with RapiDOS (or RapiDOS Professional—see below) can't be used for telecommunications.

RapiDOS Professional employs the same user-port ribbon-cable setup as RapiDOS, but a different Kernal ROM adapter board and a 5-inch piggy-back IC board are mounted inside the 1541. Again, there isn't enough room after installation to reinstall the RF shields.

The loading and saving performance of RapiDOS Professional is absolutely incredible. In my simple test, the 130-block file loaded in less than three seconds! That's more than 28 times faster than normal! Saving speed was nearly as impressive (six seconds, versus a normal 88). RapiDOS Professional accomplishes this feat by using 8K of RAM track buffering and hardware data conversion from GCR to ASCII format. The disk drive, therefore, reads an entire track into the drive RAM, where it's nearly instantaneously converted to 8-bit ASCII and then transferred to the computer over a parallel line.

RapiDOS Professional offers an option to extend a 35-track disk to 40 tracks without altering the existing data on the disk. This adds 85 blocks to the disk. It also has a command for renaming disks and changing the ID number. Otherwise, the editing features and DOS commands of this product are identical to those of RapiDOS.

Chip Level Designs also sells a Kernal replacement ROM for the C-64, called **Burst-ROM 64**. This product gives the C-64 a "Burst mode" when used with a 1571, 1581 or ICT hard drive, and it contains a DOS wedge. I didn't have an opportunity to try the Burst-ROM 64, but I did install a **Burst-ROM 128** in my C-128. It's supposed to provide the same features in 64 mode on the C-128 as the Burst-ROM 64 does on the C-64, but all I could get to work was the DOS wedge. I was never able to do fast-loading. It's possible that I made an error in the installation by clipping one of the five microclips from the circuit board to a wrong pin; the "preliminary" instructions for installation weren't very good. I hope Chip Level Designs provides better blowup diagrams in the future.

MAKING YOUR CHOICE

All of these products are much more than just fast-loaders. As we've seen, they also possess such features as fast-saving, DOS wedges, machine language monitors, graphics capturing, program copying (by memory dumping), sprite disabling, programmed function keys, Basic language extensions and new editing commands. Talk about adding power to your computer!

It's not easy to make a choice from so many products with so many different features. I would suggest that you think carefully about what is important to you and look at how each product meets your needs. Also, consider the hardware itself. Do you want a cartridge, or are you willing to open up the computer and replace integrated circuit chips? If you're considering one of the ROM replacement products, check first to see if your computer has socketed ROM chips. Finally, of course, you must factor in the cost of the product. ■

Dr. Ray Roberts, a biochemist, is the founder of KnowledgeWare, a software company in Gainesville, Florida. He is also the author of Multifinder, a shareware C-64 database manager.

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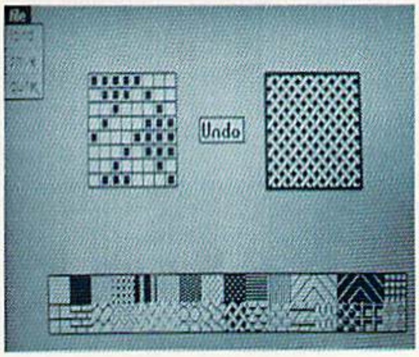
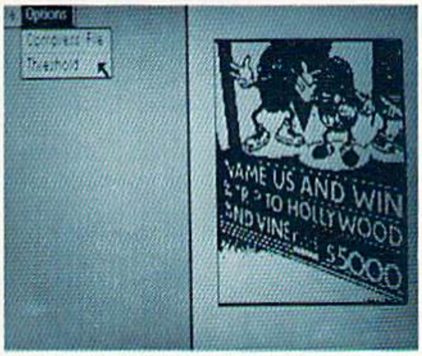
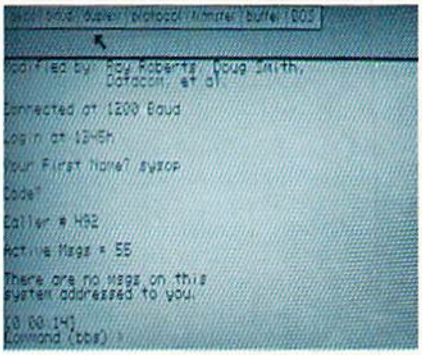


Pattern Editor—Create your own fill patterns for geoPaint.


Options
Compress File
Threshold
NAME US AND WIN
TRIP TO HOLLYWOOD
AND VINE
$5000

Thumbnail—Now you can reduce geoPaint images to display on the screen and save to disk.


baud duplex protocol xmitter buffer DOS

```
odified by: Roy Roberts, Doug Smith,
           Datacom, et al.

Connected at 1200 Baud

Login at 1345h

Your First Name? sysop

Code?

Caller # 492

Active Msgs = 55

There are no msgs on this
system addressed to you.

[0 00:14]
Command (bbs) >
```

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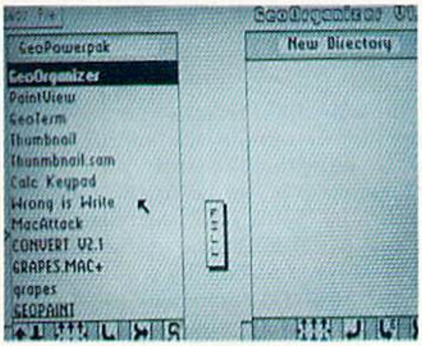
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GP888

Sequential File Design

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◇

By STEVEN ROGERS

There are four types of disk files that can be saved on a 1541/1571 or other Commodore-compatible disk drive: program files, sequential files, relative files and random files. Sequential and relative files are the types most often used for data storage, although program files are frequently used. Usually, some knowledge of assembly language programming is needed to write programs that store data in program files or random files. For that reason, these files are not covered in this article; we'll only examine sequential and relative files.

TERMINOLOGY

First, you must understand some terminology common to both sequential and relative files.

A *datafile* is a collection of records organized on a disk or tape and identified by a *filename*.

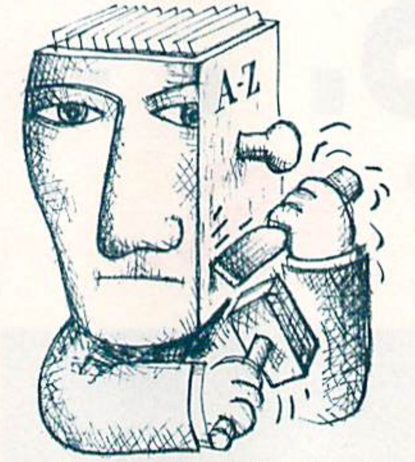
A *record* is all the data that exists between (but *not* including) the record delimiters.

A *record delimiter* is a character (usually an ASCII carriage-return character) that separates one record from the next in a datafile.

An *end-of-file delimiter*, or EOF, is the data written to a file that signifies there are no more records in the file.

Finally, a record may be subdivided into data fields, so a record may also contain a *data-field delimiter*, which is usually an ASCII comma character.

Relative files earned their name because there is a definite relationship between the record number and its position within the file. This relationship can be defined because all records in a relative file *must* have the same length. This allows relative files to use a formula (characters per record × record number) that determines a record's location by counting the number of characters from the start of a file. Therefore, it is possible for the disk operating system to read the tenth record (or any other record) in the file without reading any prior records. It is also possible to change a record by writing the changed information into the record directly.



With all the apparent power of relative files, why would anyone want to use sequential files? Well, each type has its own advantages. Here are some.

Sequential files: maximum file utilization, no fixed record size; larger total file space per disk; more total records possible per disk.

Relative files: records can be found by number without reading other records; individual records can be updated; records can be subdivided into individual fields; individual data fields within records can be retrieved with special Basic statements.

It may not be immediately apparent what type of data would best be suited for each type of file, so a little explanation is in order. The type of data that would best be saved with a sequential file is historical data and data that requires only occasional retrieval.

A specific example of historical data might be a daily record of expenses and taxes paid, for income tax purposes. After it is correctly entered, it's unlikely that this information would change. The type of data that would best be saved in a relative file would be data that constantly requires updating or frequent reference; information about a stock portfolio, for example.

THE INTELLIGENT 1541 AND 1571

Writing programs to store data on a 1541 or 1571 disk drive requires an understanding of some specific disk commands. Once you master them, however, you gain a very versatile DOS. This is because the 1541 or 1571 disk drive, and other Commodore-compatible drives are intelligent peripherals; they have their own microprocessors and both use a *serial* communication interface. Both have a primary address (usually eight, which is the device number), and may have several secondary addresses for establishing a command/error channel and data channels. The problem with using device address and secondary address is that commands must be sent and errors checked using somewhat complex Basic programming.

This article is meant to clarify and demystify the data storage techniques of the 1541 or 1571 disk drive and other Commodore-compatible disk drives.

SEQUENTIAL FILE EXPERIMENTS

Now that you have a better idea of the two general types of datafiles, let's investigate and experiment with the sequential datafile. For this, you should have an old unformatted disk. To format a blank disk, you type in the following Basic command.

```
OPEN 15,8,15,"N0:TESTDISK,##":
CLOSE 15
```

To write records into a sequential file, ►

RUN it right: **C-64 and C-128; 1541/1571 or compatible disk drive**

ILLUSTRATED BY MACIEK ALBRECHT

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CABLES

Drive/printer, 6 ft. 6 pin male/male	B66	$ 5.95
Drive/printer, 9 ft. 6 pin male/male	B69	$ 7.95
Drive/printer, 18 ft. 6 pin male/male	B618	$12.95
Drive/printer, 6 ft. 6 pin male/fem.	A66	$ 5.95
Monitor, 6 ft. 5 pin to 3 RCA plugs	M653	$ 5.95
Monitor, 6 ft. 5 pin to 2 RCA plugs	M652	$ 4.95
Monitor ext., 10 ft. 5 pin male/fem.	ME65	$ 5.95
Monitor 3 ft. 8 pin to 2 RCA plugs	M382	$ 4.95
Monitor 3 ft. 8 pin to 5 RCA plugs	M385	$ 5.95
Joystick ext. 9 pin, 12 ft. male/fem.	JS12	$ 4.95
Joystick Y, 9 pin, 1 fem./2 male	JSY	$ 6.95
Joystick Y, 9 pin, 1 male/2 fem.	RJSY	$ 3.95
Power cable, male/right ang. male	PR6	$ 6.95
DB9, 6 ft., male/male	DB9MM	$ 8.95
DB9, 6 ft., male/fem.	DB9MF	$ 8.95
8 pin Mini Din, 6 ft., male/male	8M6MM	$ 9.95
Parallel, 6 ft., male/male	C6MM	$ 9.95
Parallel, 10 ft., male/male	C10MM	$11.95
Parallel, 6 ft., male/fem.	C6MF	$ 9.95
Parallel, 10 ft., male/fem.	C10MF	$11.95
Serial, 6 ft., male/male, DB25	R6MM	$ 8.95
Serial, 6 ft., male/fem., DB25	R6MF	$ 8.95
IBM printer, 6 ft., male/male	IBP6	$ 8.95
IBM printer, 10 ft., male/male	IBP10	$10.95
IBM keyboard extension, 5 pin	IBKE	$ 5.95
Gender change, 6 pin, fem./fem.	GC6FF	$ 4.95
Gender change, parallel, male/male	CGMM	$ 9.95
Gender change, parallel, fem./fem.	GCFF	$ 9.95
Gender change, serial, male/male	GSMM	$ 5.95
Gender change, serial, fem./fem.	GSFF	$ 5.95
Gender change, DB9, male/male	G9MM	$ 4.95
Gender change, DB9, fem./fem.	G9FF	$ 4.95
Gender change, DB9, fem./DB25 male	G9F25M	$ 8.95
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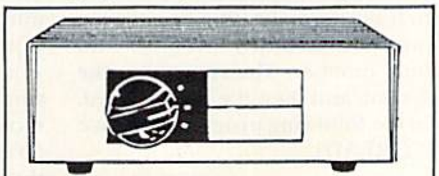

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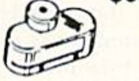

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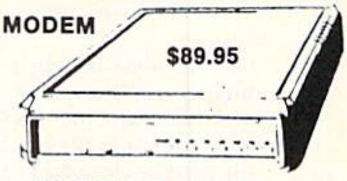

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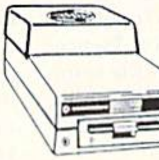

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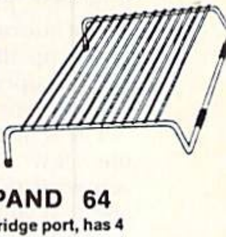

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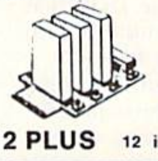

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the file must be opened and given a filename, a file number, a drive number and a data channel. Records must then be written into the file, and, finally, the file must be closed. The filename is used by the DOS to locate the file when you later want to read records from it. The file number is used by Basic so that, by sending record data to the proper data channel, it can write the records into the proper file. You should choose a file number less than 128, because larger file numbers will place, after each record, an extra record limiter (an ASCII line feed), which might cause some problems, particularly with end-of-file detection.

To experiment with writing data to a sequential file, enter and save the following program, known as SEQWRITE1.

```
1 REM **LISTING 1—SEQWRITE1**
10 OPEN 15,8,15,"S0:TAXLOG":CLOSE15:
   REM ERASES TAXLOG FILE
20 OPEN 2,8,2, "0:TAXLOG,S,W"
30 D$="H REX, MD":GOSUB 1000
40 D$="1/18/86":GOSUB 1000
50 D$="139.28":GOSUB 1000
60 CLOSE 2:END
1000 PRINT#2, D$:RETURN
```

Look at the Open statement in line 20; this opens the file. The first number (2) refers to the file number that is used later. The second number refers to the disk device (8). The third number refers to the data channel (2) that will be used to send the data to the file. For convenience, the data channel is usually chosen to be the same number as the file number, although the data channel may be any number from 2 to 14. Henceforth, any future reference to file number 2 will be allocated as such: Anything written to file 2 is sent on channel 2 to device 8.

The data that is enclosed in quotes behind the Open statement's file, device and channel number parameters is usually referred to as the filename; however, it contains much more information than just the filename. It is the actual information sent to the disk drive to set up the sequential file, and it's more properly referred to as a *file parameter string*.

The actual filename is TAXLOG, and the ",S,W" indicates to the DOS that you want to open a sequential file (S) and that you want to write to it (W).

The Print#2 statement on line 1000 writes a record into file 2, the sequential file opened in line 20. Writing records into a file is much like printing a string to the disk drive.

Remember the data-path allocation plan set up by the Open statement: Anything written to file 2 is sent on channel 2 to device 8. The 1541 or 1571 DOS knows that channel 2 will have incoming data for the TAXLOG file. Everything works according to a plan. It is also necessary to close the file. The Close 2 statement tells the DOS to write an EOF delimiter in the TAXLOG file and to cancel the file 2 data-path allocation plan.

Run the program. The record data will be written into the file in the following sequence:

```
H REX, MD*1/18/86*139.28*
```

Note: "*" represents an ASCII carriage-return character.

To read records from a file, the file must first be opened with a filename, a file number, a disk drive number and a channel number. The records in the file are read, and then the file is closed. Type in the following program and save it as SEQREAD1.

```
1 REM **LISTING 2—SEQREAD1**
10 OPEN 2,8,2, "0:TAXLOG,S,R"
20 GOSUB 1000:NA$=D$:GOSUB
   1000:DA$=D$
30 GOSUB 1000:A=VAL(D$)
40 CLOSE 2
60 PRINT NA$:PRINT DA$:PRINT
   A:END
1000 INPUT#2, D$:RETURN
```

The Open statement sets up a data-path allocation plan for file 2 to be allocated to device 8 and channel 2. When you open a sequential file for reading, the filename parameter string can contain either the filename alone or the filename and "0:" drive identifier. The absence of the ",S,R" suffix to the filename parameter string tells the DOS to assume a sequential file and a read access. The DOS locates the file by filename in the directory and prepares to provide record data on channel 2.

THE INPUT# TECHNIQUE

To read the records in the file, the Input# statement is used. The Input# statement is similar to the Input statement, except that the Input# statement expects data from a previously opened file, rather than from the keyboard. Each record is read and assigned to a variable, with a conversion to a numeric variable when necessary. Finally, the file is closed with a Close statement and variables are printed. Run the program. You should see the following:

```
H REX
1/18/86
139.28
```

Note that the , MD is missing on the above. The record written into the file with the SEQWRITE1 program was "H REX, MD", not "H REX". Actually, the entire record was read in, but the Input# statement recognized a comma in the input data and truncated the data transfer to the variable. This quirk of the Input# statement, while undesirable in this example, can be put to some use, because it enables you to input separate data fields in a single record.

When you use the Input# statement to read a record in a disk file, the DOS transfers the next record from the disk into the computer's Basic input buffer. The DOS continues to transfer characters from the record into the Basic input buffer until it reads a record terminator. The record read into the Basic input buffer corresponds exactly to what was written to the disk with the single Print# statement that wrote the record. After the DOS sees the record terminator (a carriage return), Basic then assigns the characters in the input buffer to a variable until it sees either the record terminator or a field terminator (a comma).

If the Input# statement has a list of variables separated by commas, and if there are commas in the record, then the next variable in the list will be assigned the characters in the next field of the record. To make use of data fields in records, there are some pitfalls you must avoid.

To write a record with data fields, you must place commas into the record between the fields of data. This can be done by setting a string variable equal to a comma (CM$=",") and writing the fields of data into the record using a single Print# statement as follows:

```
PRINT#2, F1$;CM$;F2$;CM$;F3$
```

Don't use a statement like "PRINT #2, F1$,F2$,F3$", because the data fields are not separated by commas. Also, you must be careful that the length of data in all the fields of the record (including the commas that delimit the fields) does not exceed 80 characters; if it does, the C-64's input buffer will overflow when you use the Input# statement to read the record. (The C-128's limit is 254 characters.)

To read a record with data fields, you must use only a single Input# statement per record, and the statement must have a variable list to indicate to Basic which variable will be used to store which data field. If the record has three data fields and you use the following statement, the data will be properly read from the disk.

```
INPUT#2, F1$,F2$,F3$
```

On the other hand, if you try to input the fields of data with separate Input# statements, for example

```
INPUT#2,F1$
INPUT#2,F2$
```

the data read will not be correct because each new Input# statement reads a new record from the disk, regardless of whether or not all of the data fields of the previous record have been assigned to variables by Basic.

There are some characters that should not be used with the Input# statement. Commas, colons and null characters will cause problems because they separate fields of data.

Before assigning the data to a variable, the Input# statement removes all leading spaces; therefore, if you want to include spaces before your data, use commas.

The length of records cannot exceed 80 characters (or, in the case of the C-128, 254 characters), since the C-64 has only an 80-character input buffer. A String Too Long error will result when the Basic input buffer is overfilled by the DOS.

The leading space problem, the comma and colon restrictions, and the 80-character record-length restriction are somewhat limiting, particularly when records contain text, so special techniques are available to overcome these restrictions.

GET# IT TOGETHER

To include commas or colons in records, use the Get# command in place of the Input# command. The Get# technique is used to input data from records that are more than 80 characters in length. To experiment with this technique, load the SEQREAD1 program and make the changes and additions that are indicated by the underlined text in the following program, which you should save as SEQREAD2.

```
1 REM **LISTING 3—SEQREAD2**
10 OPEN 2,8,2, "0:TAXLOG,S,R"
20 GOSUB 1000:NA$=D$:GOSUB 1000:
   DA$=D$
30 GOSUB 1000:A=VAL(D$)
40 CLOSE 2
60 PRINT NA$:PRINT DA$:PRINT A:END
1000 D$=""
1010 GET#2, C$:IF ASC(C$)=13 THEN
     RETURN
1020 D$=D$+C$:GOTO 1010
```

Run this program. The Get# technique eliminates the character restrictions. Normally, it would also eliminate the record-length limitations of the Input# technique. However, unlike the Input# command, which utilizes the computer's operating system, Get# uses Basic, which is substantially slower.

THE QUOTED-STRING TECHNIQUE

The Input# technique can be used to input commas and colons in record data if the records are written into the file as a quoted string. This technique works only when the record length is less than 80 characters. In this technique, the quote character (ASCII value 34 decimal) is written as the first character of the record.

The Input# technique is then used to read the records. The quote character at the start of the record forces the Input# statement, which assigns all of the data read from the record, including commas and colons (but not the initial quote character), into a *string* variable. Load the SEQWRITE1 program and make the following changes and additions indicated by the underlined text.

```
1 REM **LISTING 4—SEQWRITE2**
10 OPEN 15,8,15,"S0:TAXLOG" :CLOSE15:
   REM ERASES TAXLOG FILE
20 OPEN 2,8,2,"0:TAXLOG,S,W"
30 D$="H REX, MD":GOSUB 1000
40 D$="1/18/86":GOSUB 1000
50 D$="139.28":GOSUB 1000
60 CLOSE 2:END
1000 PRINT#2, CHR$(34);D$:RETURN
```

Save this program as SEQWRITE2 and run it. The earlier version of TAXLOG is erased and new data is now stored in the file as follows:

```
"H REX, MD*"1/18/86*"139.28*
```

Note: "*" represents an ASCII carriage-return character.

Since each record is preceded by a quotation mark, the records must be input as *string* variables, since Basic cannot input a numeric variable, even if it is preceded by a quotation mark. If the data contains numeric information, the string can be converted to a number using the VAL function. Load the SEQREAD1 progam and run it.

Note that the Input# statement now inputs a comma because of the initial quotation mark written to the record before the actual data. While the SEQWRITE2 program writes the data in a manner that permits the input of commas, colons and leading spaces, it will not permit the input of a quotation mark.

The SEQWRITE2 program writes one more character to each record than the SEQWRITE1 program, so the maximum number of records that will fit on a disk using the SEQWRITE2 program will be less than with the SEQWRITE1 program.

DETECTING THE END OF THE FILE

In practice, a sequential file will contain an unknown number of records. Therefore, you will need to know when the last record has been read from the file.

Basic provides a reserved variable, ST, to monitor the status of disk drive input/output operations. Using the Input# and Get# technique, the ST variable detects when the last record in the file is read. The next listing, SEQREAD3, tests the status variable to see if it checks for the last record.

```
1 REM **LISTING 5—SEQREAD3**
10 OPEN 2,8,2, "0:TAXLOG,S,R"
20 GOSUB 1000:PRINT "STATUS="S;D$
30 IF S AND 64=0 THEN 20
40 CLOSE 2:END
1000 INPUT#2, D$:S=ST:RETURN
```

Enter the program and save it as SEQREAD3. Run the program and note that it stops automatically after reading the three records in the "TAXLOG" file.

ADDING RECORDS

It's easy to add more records to a sequential file. Load the SEQWRITE2 program and make the changes indicated by the underlining in the listing below. Save the program as SEQWRITE3.

```
1 REM **LISTING 6—SEQWRITE3**
10 REM
20 OPEN 2,8,2, "0:TAXLOG,S,A"
30 D$="H REX, MD":GOSUB 1000
40 D$="1/18/86":GOSUB 1000
50 D$="139.28":GOSUB 1000
60 CLOSE 2:END
1000 PRINT#2, CHR$(34);D$:RETURN
```

The ",S,W" portion of the filename parameter string is replaced with ",S,A", which tells the DOS that you want to open an existing sequential file (S) and that you want to *append* (A) data to the file.

Run the SEQWRITE3 program. Every time you run it, it adds three more records to the TAXLOG sequential file. Load and run the SEQREAD3 program to verify the proper data content of the TAXLOG file.

The Append mode makes it easy to feed information into files in, say, monthly batches. Of course, the program you use would have to open and create the sequential file the first time you run the program and to use the ",S,A" parameters thereafter.

But how will the program know when to create and when to append? The program could first try to open the file ►

in the Append mode, then, if it found that the file doesn't exist, it could switch to the Create mode and create the file. To do this, however, it is necessary for the program to be able to read DOS errors on the command/error channel.

TRAPPING DISK-RELATED ERRORS

At one time or another, while using the 1541 disk drive, you've probably seen its red light flash (it's a flashing green light on the 1571). This flashing indicates that some type of error has occurred and that the disk drive is ready to tell you what type of error.

Disk errors are detected by reading the command/error channel, which is channel 15. To read this channel, open a file to it and input the error data. The error data consists of four separate types of information: the error number, a description of the error and two more miscellaneous numbers. If you've made a major error, those last two numbers will be track and sector numbers that just might permit someone to restore the data on the disk.

The following listing, the SEQREAD4 program, contains a general-purpose error-trapping routine that displays disk errors when they occur. Load the SEQREAD3 program and add or change the underlined text; then save the program as SEQREAD4.

```
1 REM **LISTING 7—SEQREAD4**
5 OPEN 15,8,15:REM ERROR CHANNEL
  WILL BE FILE 15
10 OPEN 2,8,2, "0:TAXLOG,S,R" :GOSUB
   2000
20 GOSUB 1000: PRINT "STATUS = " ;S;D$
30 IF S AND 64 = 0 THEN 20
40 CLOSE 2:CLOSE 15:END
1000 INPUT #2, D$:S = ST:GOSUB 2000:
     RETURN
2000 INPUT #20, E,ER$,T,S
2020 IF E<20, THEN RETURN
2030 PRINT E;ER$;T;S:STOP
```

Line 5 opens a file that will be used for input on the command/error channel, channel 15. Note that every disk-access statement has a call to subroutine 2000, which inputs and then checks the disk-error parameters. The error parameters will be printed out, and the program will stop if there is an important error.

Run the SEQWRITE3 program and see how many errors you can generate. Table 1 shows a list of the common user errors and the associated disk error.

Table 1. Common user errors and related disk errors.

Common user error	Disk drive error number and message
*No disk in disk drive	74 DRIVE NOT READY
*Unformatted disk in disk drive	74 DRIVE NOT READY
*Disk in drive upside down	74 DRIVE NOT READY
*Disk drive door open	74 DRIVE NOT READY
Wrong disk in disk drive	62 FILE NOT FOUND
Disk write-protected	26 WRITE PROTECT ON

*Strangely, these conditions may also generate a 21 READ ERROR on track 18, sector 0.

WRAPPING IT UP

Listing 1, SEQ/FILE/HANDLER, contains a fully commented program that's useful for designing your own data-handling programs. The subroutines from lines 390 to 990 are used to perform and check disk input/output operations, while the main body of the program demonstrates these functions.

The file-handling routine, which checks to see if a disk is in the drive, uses the Initialize command. When the disk is initialized, the block allocation map (BAM) is loaded into the drive's DOS. The Initialization command checks to see if the disk is seated properly and if it's formatted and readable.

The file-handling routine simply tries to open the file for reading and then checks for errors. When a file is created, appended or scratched (erased), the disk must not be write-protected. Each of these functions must check for error 26, "Write Protect On," and proceed accordingly. Finally, if the file parameter string is a string expression instead of a quoted string, then it must be enclosed by parentheses to force Basic to send the entire expression to the disk drive.

Use this article as a stepping-stone to explore further sequential files and to create your own programs. The more you work with sequential files, the easier they'll be for you to handle. Ⓡ

Listing 1. Sequential File Handler program.

```
10 REM SEQUENTIAL FILE HANDLER
   - STEVEN ROGERS           :REM*44
20 F$="EXPDATA"             :REM*249
30 PRINT "{SHFT CLR}SELECT MENU
    ITEM BY NUMBER":PRINT
                             :REM*77
40 PRINT " 1. ADD DATA TO EXIST
   ING FILE"                :REM*111
50 PRINT " 2. CREATE NEW FILE"
                             :REM*82
60 PRINT " 3. DISPLAY RECORDS I
   N FILE"                  :REM*216
70 PRINT " 4. ERASE FILE"
                            :REM*216
80 PRINT " 5. QUIT PROGRAM":PRI
   NT                       :REM*184
90 FOR I=1 TO 11:GET C$:NEXT I
                            :REM*201
100 GET C$:IFC$=""THEN 100
                            :REM*221
110 IF VAL(C$)<1 OR VAL(C$)>5 T
    HEN 100                  :REM*48
120 ON VAL(C$) GOSUB 140,230,30
    0,370,380               :REM*209
130 PRINT"PRESS 'C' TO CONTINUE
    ..."                    :REM*194
135 GETA$:IFA$<>"C"THEN 135
                             :REM*96
136 GOTO30                    :REM*5
140 GOSUB 390               :REM*232
150 GOSUB 560               :REM*237
160 M$="A":GOSUB640         :REM*241
170 IF E<>26 THEN 220       :REM*143
180 PRINT "CANNOT ADD DATA--DIS
    K WRITE PROTECTED.":REM*148
190 PRINT "REMOVE WRITE PROTECT
     TAB FROM DISK."         :REM*67
200 GOSUB 680                :REM*42
210 GOTO 140                 :REM*26
220 GOTO 260                 :REM*40
230 GOSUB 390                :REM*71
240 GOSUB 890                :REM*91
250 M$="W":GOSUB 640        :REM*186
260 PRINT:PRINT"TYPE RECORD DAT
    A OR 'EOF' TO STOP.":REM*34
270 INPUTD$:IF D$="EOF" THEN CL
    OSE 2:CLOSE 15:RETURN
                             :REM*86
280 GOSUB 740               :REM*108
290 GOTO 260                :REM*114
300 GOSUB 390               :REM*137
310 GOSUB 560               :REM*140
320 M$="R":GOSUB 640        :REM*199
330 GOSUB 860               :REM*170
340 PRINT "STATUS=";S;"RECORD="
    ;D$                      :REM*87
350 IF (S AND 64) THEN CLOSE 2:
    CLOSE 15:RETURN         :REM*247
360 GOTO330                 :REM*179
370 GOTO 890                :REM*213
```

```
380 END                     :REM*253
390 REM CHECK FOR VALID DISK
                            :REM*102
400 OPEN 15,8,15            :REM*247
410 PRINT#15, "I0"          :REM*171
420 GOSUB 490                 :REM*0
430 CLOSE 15                 :REM*76
440 IF E=0 THEN RETURN       :REM*54
450 PRINT:PRINT "CAN'T READ DIS
    K IN DISK DRIVE."        :REM*60
460 PRINT "CHECK DISK AND/OR DI
    SK DRIVE."               :REM*65
470 GOSUB 680                :REM*51
480 GOTO390                  :REM*62
490 REM DISK ERROR CHECK
                            :REM*243
500 INPUT#15, E,ER$,TR,SE
                             :REM*30
510 IF E<20 THEN RETURN:REM*190
520 IF E=21 AND TR=18 AND SE=0
    THEN RETURN              :REM*97
530 IF E=74 OR E=62 OR E=26 THE
    N RETURN                 :REM*96
540 CLOSE 2:CLOSE 15        :REM*137
550 PRINT E;ER$;TR;SE:STOP
                            :REM*174
560 REM FILENAME CHECK :REM*141
570 M$="R":GOSUB 640        :REM*220
580 CLOSE 2:CLOSE 15        :REM*161
590 IF E=0 THEN RETURN :REM*220
600 PRINT:PRINT "CAN'T FIND FIL
    E "F$                    :REM*19
610 PRINT "ON DISK DRIVE. INSER
    T DISK WITH FILE." :REM*217
620 GOSUB 680               :REM*201
630 GOTO560                 :REM*207
640 REM OPEN SEQ. FILE  :REM*62
650 OPEN 15,8,15            :REM*240
660 OPEN 2,8,2, ("0:"+F$+",S,"+
    M$)                      :REM*46
670 GOTO 490                :REM*254
680 REM WAIT                :REM*119
690 PRINT:PRINT "PRESS ANY KEY
    TO CONTINUE, 'Q' TO QUIT."
                            :REM*132
700 FOR I=1 TO 11:GET C$:NEXT I
                            :REM*104
710 GET C$:IF C$="" THEN 710
                             :REM*91
720 IF C$<>"Q" THEN RETURN
                             :REM*22
730 STOP                    :REM*105
740 REM                     :REM*112
750 PRINT#2, CHR$(34);D$
                            :REM*109
760 GOTO 490                 :REM*81
770 REM WRITE RECORD         :REM*50
780 PRINT#2, D$              :REM*86
790 GOTO 490                :REM*119
800 REM INPUT RECORD        :REM*131
810 D$=""                   :REM*248
820 GET#2,C$:S=ST           :REM*202
830 GOSUB 490               :REM*155
840 IF ASC(C$)=13 THEN RETURN
                             :REM*67
850 D$=D$+C$:GOTO820         :REM*32
860 REM INPUT RECORD        :REM*207
870 INPUT#2,D$:S=ST         :REM*239
880 GOTO 490                :REM*201
890 REM SCRATCH FILE        :REM*251
900 GOSUB 390               :REM*231
910 CLOSE15:OPEN15,8,15:REM*103
920 PRINT#15, ("S0:"+F$):REM*93
930 GOSUB 490                 :REM*4
940 CLOSE 15                 :REM*72
950 IF E<>26 THEN RETURN
                            :REM*243
960 PRINT:PRINT"CANNOT ERASE FI
    LE "F$                   :REM*91
970 PRINT "--REMOVE WRITE-PROTE
    CT TAB."                :REM*188
980 GOSUB 680                :REM*51
990 GOTO 890                 :REM*68
```

■

TYPE-IN TROUBLES?

Troubleshooting tips for entering listings.

YOU HAVE TYPED IN A *RUN* PROGRAM and are having some problems getting it to run. After a while, you feel like calling for help, but since we're not next door, it's expensive to call us. But we can share our experiences with you. Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these. If so, perhaps the answers will help you find and correct the difficulty.

- You get an Out of Data in Line xxx message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the line that reads the data, usually a For . . . Next loop. Make sure you have the proper values for the loop, because if the listing has a loop of 0 to 150 and you've typed 0 to 160, you'll get the "Out of Data" message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. More likely, you may have skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing.

- You get an Illegal Quantity Error in Line xxx. That means that you've read a number from a Data statement and tried to Poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. Just look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a Syntax Error in Line xxx. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an Error in Data message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if all the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully, correct the mistake(s), save the new version and try again.

Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which is printed in each issue. This nifty little program will help you avoid every mistake we mentioned above, except that it won't detect the omission of a line. ■

—LOU WALLACE

The Remarkable Disk Directory

Make your disk directories truly informative by adding your own commentary.

◇

By JAMES R. HOFFER

Annotated Directory Printer (Listing 1) is a program that will dramatically increase the usefulness of your disk directories. With it, you can add comments, references, program descriptions, special loading instructions, SYS commands, or almost anything else you wish, to the directory. This information appears in the directory display or printout right along with the usual directory information of file length, filename and filetype.

The sequential file that Annotated Directory Printer (A.D.P.) creates can be saved on the same disk you're annotating, and its name will be the same as the name of the disk. You can add to or modify the file as needed.

A.D.P.'s main menu appears in Table 1. In using the program's various functions, be sure to follow the instructions carefully.

Choose option 4 to create a new file. If you have no comment about a particular directory entry, the program will automatically leave the comment area for that item blank when printing out the directory.

When you choose option 3 to update a file, the merge screen will remind you to superimpose the normal directory over the sequential file. Then, using option 4, you can add comments to each new item in the directory and change other items at will. A merge, however, will only be successful if the order of the items in the directory has not been altered—in other words, if you have only added new programs to the end of the list.

Table 1. The A.D.P. main menu.

1. Load disk directory.
2. Load annotated directory.
3. Merge directories.
4. Display entries, add notes.
5. Print annotated directory.
6. End program.

To print out the annotated directory, follow the prompts in option 5. You can provide alternative typestyles for the printout by modifying A.D.P. to include appropriate codes for your printer. An alternative typestyle would be helpful, for instance, for preparing a small archive printout to be kept right in the disk envelope.

I used a few tricks in writing A.D.P. that might interest you if you're a programmer. Note the screen and color Pokes that produce the green arrows next to the main menu and the asterisk used as an end-of-file marker. Also, I dimensioned all the string variables to 144, the maximum number of directory entries. Ⓡ

James R. Hoffer is a clergyman whose hobbies include computers and amateur radio.

Listing 1. Annotated Directory Printer program.

```
0 REM ANNOTATED DIRECTORY - JAM
  ES R. HOFFER             :REM*79
100 CLR:DIMT$(196),H$(144),N$(1
    44),TP$(144),CT$(144),F$(14
    4)                     :REM*201
110 T$(128)="DEL ":T$(129)="SEQ
     ":T$(130)="PRG ":T$(131)="
    USR ":T$(132)="REL ":REM*45
120 T$(192)="DEL<":T$(193)="SEQ
    <":T$(194)="PRG<":T$(195)="
    USR<":T$(196)="REL<"
                           :REM*128
130 POKE53280,1:POKE53281,1
                           :REM*207
140 OPEN15,8,15            :REM*252
150 PRINT"{SHFT CLR}{3 CRSR DNs
    }{COMD 3}{5 SPACEs}THE ANNO
    TATED DISK DIRECTORY
                           :REM*208
160 PRINTSPC(4)"{2 CRSR DNs}{CO
    MD 7}1. LOAD DISK DIRECTORY
                            :REM*60
170 PRINTSPC(4)"2. LOAD ANNOTAT
    ED DIRECTORY           :REM*224
180 PRINTSPC(4)"3. MERGE DIRECT
    ORIES                  :REM*217
190 PRINTSPC(4)"4. DISPLAY ENTR
    IES, ADD NOTES          :REM*28
200 PRINTSPC(4)"5. PRINT ANNOTA
    TED DIRECTORY           :REM*18
210 PRINTSPC(4)"6. END PROGRAM
                            :REM*87
220 GETK$:IFK$<"1"ORK$>"6"THEN2
    20                      :REM*65
230 IFK$="1"THEN300        :REM*254
240 IFK$="2"THEN730         :REM*45
250 IFK$="3"THEN890        :REM*128
260 IFK$="4"THEN1000        :REM*95
270 IFK$="5"THEN1690       :REM*236
280 POKE1466,42:POKE55738,5:FOR
    X=0TO750:NEXT          :REM*137
290 CLOSE15:PRINT"{SHFT CLR}":E
    ND                     :REM*128
300 REM LOAD DISK DIRECTORY
                           :REM*252
310 POKE1266,42:POKE55538,5
                            :REM*78
320 DN$="":ID$=""          :REM*117
330 FORX=0TO500:NEXT       :REM*162
340 PRINT"{HOME}{15 CRSR DNs}{C
    OMD 4}{7 SPACEs}INSERT DISK
    ETTE IN DRIVE            :REM*3
350 PRINTSPC(12)"{2 CRSR DNs}CO
    NTINUE?{2 SPACEs}Y/N
```

►

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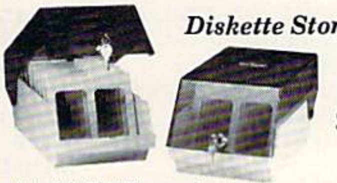

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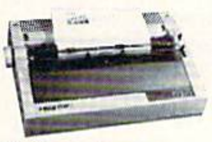

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DISK DIRECTORY

```
                          :REM*184
360 GETQ$:IFQ$=""THEN360
                          :REM*189
370 IFQ$="N"THEN150      :REM*70
380 IFQ$<>"Y"THEN360     :REM*10
390 PRINT#15,"I0         :REM*120
400 INPUT#15,EN,EM$,ET,ES
                          :REM*81
410 IFEN>20THENCLOSE15:PRINT"{S
    HFT CLR}DISK ERROR:"EM$:RUN
                          :REM*197
420 OPEN1,8,2,"$"        :REM*231
430 FORA=0TO141:GET#1,A$:NEXT
                          :REM*51
440 A$="":FORA=0TO17:GET#1,A$:D
    N$=DN$+A$:NEXT:REM DISK NAM
    E                     :REM*57
450 A$="":FORA=0TO5:GET#1,A$:ID
    $=ID$+A$:NEXT:REM DISK ID
                          :REM*87
460 PRINT#15,"M-R"CHR$(250)CHR$
    (2)CHR$(3):REM BYTES FREE
                          :REM*20
470 A$="":GET#15,A$:L=ASC(A$+CH
    R$(0))                :REM*201
480 GET#15,A$,A$:H=ASC(A$+CHR$(
    0))                   :REM*123
490 BF=L+(H*256)         :REM*179
500 FORA=0TO87:GET#1,A$:NEXT
                          :REM*182
510 PRINT"{SHFT CLR}{6 SPACEs}{
    CTRL 9} "DN$;ID$;"{2 SPACEs
    }"                    :REM*16
520 N=0:REM # ENTRIES    :REM*253
530 FORP=1TO8:N=N+1:B$=""
                          :REM*214
540 GET#1,T$,A$,A$       :REM*100
550 IFT$=""THENFORA=0TO26:GET#1
    ,A$:NEXT:N=N-1:GOTO660
                          :REM*157
560 TP$(N)=T$(ASC(T$))   :REM*181
570 FORA=0TO15:GET#1,A$:B$=B$+A
    $:NEXT                :REM*84
580 N$(N)=B$             :REM*125
590 FORA=0TO8:GET#1,A$:NEXT:GET
    #1,L$,H$              :REM*55
600 L=ASC(L$+CHR$(0))+256*ASC(H
    $+CHR$(0)):IFL=0THEN670
                          :REM*39
610 H$(N)=RIGHT$("{2 SPACEs}"+R
    IGHT$(STR$(L),LEN(STR$(L))-
    1),3)                 :REM*154
620 F$(N)=H$(N)+"{2 SPACEs}"+N$
    (N)+"{2 SPACEs}"+TP$(N)
                          :REM*59
630 IFN<10THENPRINT"{2 SPACEs}"
    N"{CRSR LF}. "F$(N):GOTO660
                          :REM*134
640 IFN>9ANDN<100THENPRINT" "N"
    {CRSR LF}. "F$(N):GOTO660
                          :REM*43
650 IFN>99THENPRINTN"{CRSR LF}.
    "F$(N)                :REM*121
660 IFSTTHEN690          :REM*26
670 IFP<8THENGET#1,A$,A$:REM*34
680 NEXT:GOTO530         :REM*36
690 Z=N:PRINTSPC(5)BF"BLOCKS FR
    EE                    :REM*112
700 CLOSE1:PRINT"{CTRL 7}{3 CRS
    R DNs}{3 SPACEs}PRESS {CTRL
    9}SPACE{CTRL 0} TO RETURN
    TO MENU               :REM*19
710 GETS$:IFS$<>CHR$(32)THEN710
                          :REM*96
720 GOTO150              :REM*31
730 REM LOAD ANNOTATED DIRECTOR
    Y                     :REM*29
740 DN$=""               :REM*102
750 POKE1306,42:POKE55578,5
                          :REM*99
760 FORX=0TO750:NEXT     :REM*155
770 INPUT"{HOME}{15 CRSR DNs}{C
    OMD 4}{5 SPACEs}FILENAME:";
    DN$                   :REM*244
780 PRINT                :REM*166
790 OPEN5,8,5,"0:"+DN$+",S,R"
                          :REM*20
800 INPUT#15,EN,EM$,ET,ES
                          :REM*39
810 IFEN>20THENPRINTTAB(5)EM$:F
    ORX=0TO1000:NEXT:CLOSE5:GOT
    O730                  :REM*39
820 N=0:INPUT#5,DN$:INPUT#5,ID$
    :INPUT#5,BF           :REM*185
830 N=N+1                :REM*126
840 INPUT#5,H$(N):IFH$(N)="*"TH
    ENN=N-1:Z=N:CLOSE5:GOTO150
                          :REM*107
850 INPUT#5,N$(N)        :REM*1
860 INPUT#5,TP$(N)       :REM*114
870 INPUT#5,CT$(N)       :REM*84
880 GOTO830              :REM*199
890 REM HELP SCREEN      :REM*238
900 POKE1346,42:POKE55618,5:FOR
    X=0TO750:NEXT         :REM*172
910 PRINT"{SHFT CLR}{COMD 5}{3
    CRSR DNs}{5 SPACEs}TO MERGE
     FILES SUCCESSFULLY, THE ";
                          :REM*216
920 PRINT"{3 SPACEs}PROGRAMS ON
     THE DISK DIRECTORY MUST BE
    {2 SPACEs}IN THE SAME ORDER
     AS ";                :REM*147
930 PRINT"THE PROGRAMS ON{4 SPA
    CEs}THE CORRESPONDING SEQ F
    ILE.                  :REM*235
940 PRINT"{3 CRSR DNs}{5 SPACEs
    }PERFORM OPERATIONS (2) AND
     (1){6 SPACEs}FROM THE MAIN
     MENU, ";             :REM*180
950 PRINT"AND THE FILES WILL{2
    SPACEs}BE MERGED.{2 SPACEs}
    THEN YOUR COMMENTS AND
                          :REM*178
960 PRINT" NOTES CAN BE ADDED.
                          :REM*252
970 PRINT"{3 CRSR DNs}{3 SPACEs
    }PRESS {CTRL 9}SPACE{CTRL 0
    } TO RETURN TO MENU :REM*98
980 GETS$:IFS$<>CHR$(32)THEN980
                          :REM*61
990 GOTO150              :REM*46
1000 REM DISPLAY ENTRIES, ADD/C
     HANGE COMMENTS      :REM*190
1010 POKE1386,42:POKE55658,5
                          :REM*125
1020 FORX=0TO750:NEXT    :REM*132
1030 N=1                 :REM*77
1040 IFN$(N)=""THENPRINT"{HOME}
     {14 CRSR DNs}{COMD 4}{8 SP
     ACEs}NO DIRECTORY IN MEMOR
     Y                   :REM*176
1050 FORX=0TO750:NEXT   :REM*166
1060 IFN$(N)=""THENPOKE1386,32:
     FORE=1584TO1623:POKEE,32:N
     EXT:GOTO220         :REM*145
1070 PRINT"{HOME}{14 CRSR DNs}{
     COMD 5} WAIT..."    :REM*93
1080 RESTORE             :REM*192
1090 FORA=828TO893:READB:POKEA,
     B:NEXT:SYS828:POKE2,178:PO
     KE3,1               :REM*52
1100 PRINT"{HOME}{16 CRSR DNs}{
     CTRL 9}{COMD 5}{40 SPACEs}
     ";                  :REM*190
1110 PRINT"{CTRL 9}{40 SPACEs}"
     ;                   :REM*171
1120 PRINT"{CTRL 9}{4 SPACEs}RE
     FERENCES, LOADING INSTRUCT
     IONS{4 SPACEs}";    :REM*11
1130 PRINT"{CTRL 9}{10 SPACEs}P
     ROGRAM DESCRIPTIONS{10 SPA
     CEs}";              :REM*102
1140 PRINT"{CTRL 9}{40 SPACEs}"
     ;                   :REM*181
1150 POKE4,12:PRINT"{CTRL 9}{40
      SPACEs}";          :REM*85
1160 PRINT"{CTRL 9}{8 SPACEs}AV
     OID COMMAS AND COLONS{9 SP
     ACEs}";             :REM*162
1170 PRINT"{CTRL 9}{40 SPACEs}"
     ;                   :REM*215
1180 PRINT"{CTRL 9}{39 SPACEs}"
     ;                   :REM*44
1190 POKE2023,160:POKE56295,12
                         :REM*6
1200 PRINT"{HOME}{14 CRSR DNs}{
     CTRL 0}{CTRL 6}{6 SPACEs}{
     CTRL 9}E{CTRL 0}NTIRE LIST
     , OR BY {CTRL 9}N{CTRL 0}U
     MBER?               :REM*60
1210 GETQ$:IFQ$<>"E"ANDQ$<>"N"T
     HEN1210             :REM*238
1220 IFQ$="E"THENN=0:GOTO1420
                         :REM*63
1230 PRINT"{HOME}";:FORA=0TO600
     :PRINT" ";:NEXT:N=0
                         :REM*228
1240 INPUT"{HOME}{COMD 5}WHAT N
     UMBER";N            :REM*218
1250 IFN<>0ANDN<=ZTHEN1320
                         :REM*63
1260 IFN<1THENPRINT"{2 CRSR DNs
     }{CTRL 3}OUT OF RANGE":FOR
     X=0TO750:NEXT       :REM*158
1270 IFN>ZTHENPRINT"{2 CRSR DNs
     }{CTRL 3}OUT OF RANGE":FOR
     X=0TO750:NEXT       :REM*118
1280 PRINT"{CRSR DN}{CTRL 6}ANO
     THER NUMBER?{2 SPACEs}Y/N
                         :REM*111
1290 GETQ$:IFQ$<>"Y"ANDQ$<>"N"T
     HEN1290             :REM*28
1300 IFQ$="Y"THEN1230   :REM*99
1310 IFQ$="N"THEN1510   :REM*83
1320 IFN<0THEN1260      :REM*93
1330 PRINT"{HOME}{2 CRSR DNs}{C
```

```
     OMD 5}YOUR NOTES ON {COMD
     7}"N$(N)              :REM*16
1340 PRINT"{CRSR DN}{CTRL 3}CUR
     RENT NOTES:          :REM*179
1350 PRINT"{CTRL 6}"CT$(N)
                          :REM*240
1360 PRINT"{CRSR DN}{CTRL 3}NEW
      NOTES OR COMMENTS:
                          :REM*245
1370 PRINT"{CTRL 6}";:INPUTCT$(
     N)                    :REM*51
1380 PRINT"ANOTHER NUMBER?{2 SP
     ACEs}Y/N              :REM*31
1390 GETQ$:IFQ$<>"Y"ANDQ$<>"N"T
     HEN1390              :REM*153
1400 IFQ$="Y"THEN1230    :REM*199
1410 GOTO1510             :REM*200
1420 N=N+1:IFN$(N)=""THENN=N-1:
     GOTO1510              :REM*67
1430 IFH$(N)="*"THENN=N-1:GOTO1
     510                  :REM*192
1440 PRINT"{HOME}";:FORA=0TO600
     :PRINT" ";:NEXT      :REM*208
1450 PRINT"{HOME}{2 CRSR DNs}{C
     OMD 5}YOUR NOTES ON {COMD
     7}"N$(N)             :REM*136
1460 PRINT"{CRSR DN}{CTRL 3}CUR
     RENT NOTES:          :REM*203
1470 PRINT"{CTRL 6}"CT$(N)
                           :REM*73
1480 PRINT"{CRSR DN}{CTRL 3}NEW
      NOTES OR COMMENTS:
                          :REM*110
1490 PRINT"{CTRL 6}";:INPUTCT$(
     N)                   :REM*187
1500 GOTO1420              :REM*18
1510 POKE4,1               :REM*37
1520 REM SAVE ANNOTATED DIRECTO
     RY                   :REM*195
1530 PRINT"{SHFT CLR}{2 CRSR DN
     s}{COMD 4}SAVE ANNOTATED D
     IRECTORY TO DISK (Y/N) ?
                            :REM*9
1540 GETQ$:IFQ$<>"Y"ANDQ$<>"N"T
     HEN1540               :REM*70
1550 IFQ$="N"THEN150     :REM*246
1560 PRINT#15,"S0:"DN$    :REM*22
1570 OPEN5,8,5,"0:"+DN$+",S,W"
                          :REM*130
1580 INPUT#15,EN,EM$,ET,ES
                           :REM*38
1590 IFEN>20THENPRINTEM$:FORX=0
     TO1000:NEXT:CLOSE5:CLOSE15
     :RUN                 :REM*250
1600 N=0:PRINT#5,DN$:PRINT#5,ID
     $:PRINT#5,BF         :REM*159
1610 N=N+1                :REM*143
1620 IFH$(N)=""THEN1680:REM*154
1630 IFH$(N)="*"THEN1680
                          :REM*241
1640 PRINT#5,H$(N):PRINT#5,N$(N
     ):PRINT#5,TP$(N)      :REM*52
1650 IFCT$(N)=""THENPRINT#5,"(N
     ONE)"                :REM*191
1660 IFCT$(N)<>""THENPRINT#5,CT
     $(N)                 :REM*103
1670 GOTO1610             :REM*206
1680 N=N-1:Z=N:PRINT#5,"*":CLOS
     E5:POKE4,1:GOTO150  :REM*87
1690 REM PRINT ANNOTATED DIRECT
     ORY                  :REM*214
1700 POKE1426,42:POKE55698,5:FO
     RX=0TO500:NEXT       :REM*137
1710 IFN$(1)=""THENPRINT"{HOME}
     {14 CRSR DNs}{COMD 4}{8 SP
     ACEs}NO DIRECTORY IN MEMOR
     Y                    :REM*207
1720 FORX=0TO1000:NEXT :REM*104
1730 IFN$(1)=""THENPOKE1426,32:
     FORE=1584TO1623:POKEE,32:N
     EXT:GOTO220          :REM*117
1740 PRINT"{SHFT CLR}{3 CRSR DN
     s}{COMD 1}BE SURE PRINTER
     IS TURNED ON         :REM*192
1750 PRINT"{2 CRSR DNs}{CTRL 9}
     U{CTRL 0}PPER OR {CTRL 9}L
     {CTRL 0}OWER CASE, OR {CTR
     L 9}A{CTRL 0}BORT? :REM*28
1760 GETU$:IFU$<>"U"ANDU$<>"L"A
     ND U$<>"A"THEN1760:REM*209
1770 IFU$="A"THEN150     :REM*157
1780 IFU$="U"THENOPEN4,4:REM*62
1790 IFU$="L"THENOPEN4,4,7
                           :REM*21
1800 N=0:PRINT#4,SPC(6)"{CTRL 9
     }{2 SPACEs}"DN$ID$" {CTRL
     0}";:PRINT#4,SPC(5)"{CTRL
     9} NOTES: {CTRL 0}"
                          :REM*114
1810 N=N+1:IFH$(N)="*"THEN1900
                          :REM*248
1820 IFH$(N)=""THEN1900 :REM*31
1830 IFN<10THENPRINT#4,"{2 SPAC
     Es}"N;:GOTO1860       :REM*59
1840 IFN>9ANDN<100THENPRINT#4,"
      "N;:GOTO1860        :REM*163
1850 IFN>99THENPRINT#4,N;
                           :REM*85
1860 PRINT#4,SPC(1)H$(N)SPC(5-L
     EN(H$(N)));          :REM*140
1870 IFCT$<>"(NONE)"THENPRINT#4
     ,N$(N)+"{2 SPACEs}"+TP$(N)
     +"{5 SPACEs}"+CT$(N)
                          :REM*171
1880 IFCT$="(NONE)"THENPRINT#4,
     N$(N)+"{2 SPACEs}"+TP$(N)
                          :REM*199
1890 GOTO1810             :REM*163
1900 PRINT#4,SPC(5)BF"BLOCKS FR
     EE                   :REM*177
1910 PRINT#4:CLOSE4:GOTO150
                           :REM*31
1920 REM SPLIT BORDER DATA
                          :REM*249
1930 DATA 120,169,88,141,20,3,1
     69,3,141,21,3,169 :REM*108
1940 DATA 129,141,26,208,169,27
     ,141,17,208,169,127,141
                           :REM*26
1950 DATA 13,220,88,96,169,1,14
     1,25,208,166,4,160:REM*251
1960 DATA 0,173,18,208,197,2,17
     6,4,166,3,164,2       :REM*67
1970 DATA 142,32,208,140,18,208
     ,173,13,220,74,144,3
                          :REM*155
1980 DATA 76,49,234,76,188,254
                          :REM*238 ■
```

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Mom's Kitchen Aid

Shopping for a way to make your kitchen more efficient?
Put this program on your menu.

◇

By LON OLSON

MENU
FLOUR
SHOPPING
LIST
Kate

As any homemaker knows, the kitchen is a hectic place, especially at mealtime. Mom's Kitchen Aid won't exactly slow the pace, but it will help get things in order. Two programs in one, it prints out blank forms for both menus and shopping lists. The one-page menu form has room for a week's meals; the shopping list form is filled with four blanks that, when cut apart, are just the right size to carry to the store.

You may want to post the forms on the kitchen bulletin board or the refrigerator door, so family members can see what meals are scheduled and make additions to the grocery list.

Mom's Kitchen Aid works in 64 or 128 mode and supports virtually any printer. Naturally, take care to type in the lines exactly as shown, and save a copy of the program to disk before running it.

After typing RUN, you're prompted for the name you want printed on each form. If you want Mom, just press the return key. Next, enter 1 or 2 to designate the form to be printed, first making sure that your printer is turned on and the paper is aligned with the top of the printhead.

Lines 60–80 of the program contain three printer codes that work with most Commodore and third-party printers. If you have a 1526 or MPS-802 that uses the OPEN 6,4,6 : PRINT#6,CHR$(XX) format for line spacing, remove the first REM in line 330 to bring your lines closer together. Everything else remains the same. Ⓡ

Listing 1. Mom's Kitchen Aid program.

```
20 REM MOM'S KITCHEN AID
                        :REM*127
30 REM BY L. OLSON      :REM*187
60 A$=CHR$(14)          :REM*147
70 B$=CHR$(15)          :REM*161
80 C$=CHR$(10)          :REM*153
90 POKE53281,15:POKE53280,14
                        :REM*143
100 F$="{10 COMD +s}"   :REM*107
110 PRINT"{SHFT CLR}{CTRL 1}"TA
    B(11)"{3 CRSR DNs}{CTRL 9}{
    3 SPACEs}KITCHEN AID{3 SPAC
    Es}":PRINT TAB(11)"{CTRL 9}
     FORMS GENERATOR " :REM*181
120 PRINT"{CTRL 7}{2 CRSR DNs}{
    3 SPACEs}ENTER THE NAME TO
    BE USED AT THE"     :REM*208
130 PRINT"{3 SPACEs}TOP OF THE
    FORMS{CTRL 3}{3 SPACEs}MOM{
    5 CRSR LFs}";:INPUT MM$
                         :REM*88
140 PRINT"{2 CRSR DNs}{3 SPACEs
    }{CTRL 9}{CTRL 3} MAKE SURE
     PRINTER IS TURNED ON {CTRL
     1}"                 :REM*93
150 PRINT"{CTRL 1}{2 CRSR DNs}{
    3 SPACEs}{CTRL 9}CHOICES:":
    PRINT"{3 SPACEs}1) MENU PLA
    NNER FORM"          :REM*167
160 PRINT"{3 SPACEs}2) SHOPPING
     LIST FORM":PRINT"{3 SPACEs
    }{CTRL 9}ENTER CHOICE:"
                          :REM*24
170 GET K$:IFK$<>"1"ANDK$<>"2"T
    HEN 170             :REM*203
180 PRINT"{CRSR UP}"TAB(17)K$
                        :REM*251
190 OPEN4,4:PRINT TAB(13)"{3 CR
    SR DNs}{CTRL 9} PRINTING...
     ":IF K$="2" THEN 440
                        :REM*163
200 REM -----------MENU PLANNER-
    ---------             :REM*99
210 Q$="{CTRL 9}{2 SPACEs}"+MM$
    +"'S DAILY MENU PLANNER{2 S
    PACEs}{CTRL 0}":R$="FOR WEE
    K OF {18 COMD @s}"    :REM*3
220 TB=INT((15-LEN(MM$))/2)
```

►

RUN it right: **C-64 or C-128; printer**

ILLUSTRATED BY KATE BRENNAN HALL

```
                          :REM*21
230 S$=" SUNDAY{4 SPACEs}MONDAY
    {4 SPACEs}TUESDAY{2 SPACEs}
    WEDNESDAY"           :REM*177
240 W$="THURSDAY{3 SPACEs}FRIDA
    Y{3 SPACEs}SATURDAY{4 SPACE
    s}NOTES:":E$=F$+F$+F$+F$:O$
    =" "                 :REM*194
250 P$="{9 COMD Os}":GOSUB 310:
    T$=N$:GOSUB 320:X$=N$
                         :REM*203
260 P$="{COMD G}{CTRL 9}MORNING
    {CTRL 0}{COMD M}":GOSUB 310
    :T1$=N$:GOSUB 320:X1$=N$
                         :REM*167
270 P$="{COMD G}{CTRL 9} NOON{2
     SPACEs}{CTRL 0}{COMD M}":G
    OSUB 310:T2$=N$:GOSUB 320:X
    2$=N$                :REM*182
280 P$="{COMD G}{CTRL 9}EVENING
    {CTRL 0}{COMD M}":GOSUB 310
    :T3$=N$:GOSUB 320:X3$=N$
                         :REM*158
290 P$="{COMD G}{7 SPACEs}{COMD
     M}":GOSUB 310:U$=N$:GOSUB
    320:Y$=N$             :REM*42
300 P$="{9 COMD Us}":GOSUB 310:
    V$=N$:GOSUB 320:Z$=N$:QQ=0:
    GOTO 330             :REM*248
310 N$=P$+O$+P$+O$+P$+O$+P$:RET
    URN                  :REM*124
320 N$=P$+O$+P$+O$+P$:RETURN
                         :REM*243
330 REM OPEN 6,4,6:QQ=1:REM USE
     THIS LINE IF 1526, 802 OR
    SIMILAR PRINTER USED
                         :REM*153
340 L=7:IF QQ=1 THEN L=12
                          :REM*35
350 PRINT#4,B$A$E$:PRINT#4,SPC(
    TB)Q$:PRINT#4,E$C$    :REM*94
360 PRINT#4,TAB(5)R$:PRINT#4,E$
    :IF QQ=1 THEN PRINT#6,CHR$(
    24)                   :REM*17
370 PRINT#4,S$:PRINT#4,T$:PRINT
    #4,T1$:FORJ=1TOL-1:PRINT#4,
    U$:NEXTJ:PRINT#4,T2$:REM*77
380 FORJ=1TOL:PRINT#4,U$:NEXTJ:
    PRINT#4,T3$:FORJ=1TOL+1:PRI
    NT#4,U$:NEXTJ        :REM*156
390 PRINT#4,V$C$:PRINT#4,W$:PRI
    NT#4,X$:PRINT#4,X1$:FORJ=1T
    OL-1:PRINT#4,Y$:NEXTJ:REM*2
400 PRINT#4,X2$:FORJ=1TOL:PRINT
    #4,Y$:NEXTJ:PRINT#4,X3$:FOR
    J=1TOL+1:PRINT#4,Y$ :REM*88
410 NEXTJ:PRINT#4,Z$C$C$:IF QQ=
    1 THEN PRINT#6,CHR$(36)
                          :REM*69
420 CLOSE4:CLOSE6:RUN      :REM*6
430 REM SHOPPING LIST    :REM*133
440 V$=F$+"{8 COMD +s}":W$="{18
     COMD Ts}":X$="{14 COMD @s}
     {COMD @}"            :REM*58
450 Y$=MM$+"'S SHOPPING LIST":T
    B=INT((21-LEN(MM$))/2):Z$="
    {3 SPACEs}"          :REM*226
460 FOR J=1 TO 2:PRINT#4,B$A$V$
    Z$V$B$               :REM*119
470 PRINT#4,SPC(TB)Y$SPC(TB+6)S
    PC(TB)Y$              :REM*78
480 PRINT#4,A$W$Z$W$B$:FOR I=1
    TO 28:IF I<10 THEN PRINT#4,
    " "I;:GOTO 500       :REM*204
490 PRINT#4,I;           :REM*188
500 PRINT#4,A$X$Z$B$;:IF I<10 T
    HEN PRINT#4," "I;:GOTO 520
                         :REM*222
510 PRINT#4,I;           :REM*200
520 PRINT#4,A$X$B$:NEXT I:PRINT
    #4,A$V$Z$V$B$:NEXTJ:CLOSE4:
    PRINT                 :REM*81
530 RUN                  :REM*158
```

■

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COMMODORE CLINIC

Can a 1750 RAM expander be used as a disk drive to store programs? How are trigonometric formulas written in Basic?

By LOU WALLACE

UPDATE

Q *I'm writing to you in reference to a "bug" in the Commodore math routines you discussed back in the March 1988 Clinic. The problem isn't a bug, but a consequence of the floating-point math routines. It results from rounding off, as you pointed out, and from the rounding of answers in the floating-point routines.*

*In your example, the rounding that contributes to the problem occurs in X*10 and is a result of the representation of decimal 0.4 in the binary floating-point system, which causes the shift of a 1 into bit 7 of the rounding byte. The results for the negative case are essentially the same except for the operation of the INT(. . .) function of Basic, which returns the closest integer value that is less than the argument. For negative numbers, this gives a (negative) integer that is larger in absolute value (magnitude without regard to sign) than the argument.*

—STUART RUDIN, PHD
SCOTTSDALE, AZ

A Thanks for the information. As I've stated before, this is something all Basic programmers who use floating-point routines should be aware of. Interestingly, this "math-bug" subject has generated more discussion than the alleged use of astrology in the White House. Still, the more we know about our computers, the better programmers and users we become.

SOFTWARE

Q *Is there a commercial desktop publisher available for the CP/M mode of my C-128? Also, is there a battery-powered RAM expander for the 128?*

—RUDOLF ELIZABETH
CURACAO, NETHERLANDS ANTILLES

A CP/M is not one of my strong points, so all I can say is, there isn't any that I know of. And since it's an older operating system with little new software being developed, I would be surprised if any desktop publishers have been designed for it. But if any readers know of a CP/M desktop publisher, please write in, and I'll pass on the information.

As for battery-powered RAM cartridges, which retain data after you turn off the computer, there are the 16K, 32K and 64K Brown Box cartridges. These can contain up to 64K of battery backed-up RAM to be used for storage and instant recall of your favorite utilities and unprotected software. They're available from Brown Boxes, Inc. (26 Concord Rd., Bedford, MA 01730).

Q *A few years ago I bought the VIC-20 version of the Voicebox made by a company called The Alien Group. I've since upgraded to a C-64 and would like to get the software for the 64 version of Voicebox, but the company is out of business. Is there any way I can get a copy of this program?*

—KEN HUGHES
11671 SEABROOK CRESCENT
RICHMOND, B.C.,
CANADA V7A 3H2

A Unless you find it gathering dust on a dealer's shelf, I wouldn't expect you to be able to buy it. And that's a shame, since it was a rather clever voice synthesizer. I had one, along with a number of support software packages, including a music editor and a singing high-resolution face (complete with bowtie). Your best bet is that a reader of Commodore Clinic owns, and no longer needs, the 64 versions of those programs. In hopes of that, I am printing your address, so that he or she may contact you. Good luck!

Q *Are there any programs that let you redefine characters and then save them?*

—JOSE ANTONIO ROBREDO
GUADALAJARA, JALISCO, MEXICO

A There are many good public domain character-set editors available for the C-64, and the fonts made with them can also be used with the C-128. Look for them in your user's group library or local BBS. Most of the major commercial telecomputing networks (QuantumLink, CompuServe and GEnie, for example) have character editors in their libraries that are available for downloading. If you want to get started right away, take a look at Magic's Trick of the Month in this issue for an excellent entry that lets you quickly redefine characters from Basic.

HARDWARE

Q *I have an SX-64 portable computer and would like to add on the new 1764 RAM expander. Is it compatible with the SX 1541 ROM? And, since the power supply on the SX is internal, how does one use the new power supply that comes with the expander, or is the power supply built into the SX capable of handling it?*

—ALAN TREMBLAY
CHRISTOPHER LAKE, SASK., CANADA

A The official Commodore policy is that the 1764 is only for the C-64, and not compatible with the SX-64. However, unofficially I have been told the power supply on *most* SX-64s will allow you to use the RAM expander; but be warned that there is always the (small) possibility of damage. Another potential problem, and one more likely to occur with the SX-64 and 1764, comes from the VIC-II graphic chip. The VIC-II chip in some of the older SXs simply won't work with the 1764. If that happens, just have a new VIC-II chip installed in the SX.

Q *A few months ago I bought a 1750 RAM expander for my C-128. How can I use it as a disk drive to store programs? Also, is there a program that will help me make better use of this add-on device?*

—JOHN EACOTT
WOODSTOCK, ONTARIO, CANADA

A You can use the 1750 (as well as the 1700 and 1764) RAM cartridge as a high-speed disk drive by using the ►

official Commodore RAMDOS software. It recently was released into the public domain by Commodore, so it should be accompanying RAM cartridges by now. However, if you didn't get it with the cartridge when you bought it, check your local user's group libraries as well as various online services or BBSs. It's also available for downloading from the RUNning Board BBS (603-924-9704) here at *RUN*.

Q *I recently installed the ROM updates in my C-128 and 1571 drive. Since then, I purchased the Copy II and Fast Hack'Em copy programs. The programs work fine in 64 mode, but cause the computer system to hang up when operating in 128 mode. The programs are supposed to run in 128 mode. Is there a correlation between the ROM upgrades and this problem?*

—EDWARD W. YODER
MURRYSVILLE, PA

A Yes, the new ROM chips do interfere with some copy programs (notably Fast Hack'Em) as well as a few copy-protected programs. There's a patch routine for Fast Hack'Em available on Q-Link (in the C-128 Hardware Support Area) and in the C-128 area of GEnie. This software patch lets you use Fast Hack'Em with the new 1571 ROMs.

PROGRAMMING

Q *I want to mix text and graphics on my C-128 in 40-Column mode. I know how to use the GShape/SShape commands, but I have trouble with the Char command. Could you give me a simple demostration of writing on the screen, perhaps much like a typewriter would do?*

—DONALD WESTPHAL
PETERBOROUGH, NH

A No problem! To demonstrate, I wrote a fairly simple program that does just that, creating a full-screen text editor in Graphics mode. That means you can cursor around the screen, and anything you type will be printed to the screen. Pressing return causes the cursor, which is a sprite, to move to the beginning of the next line. And using the control or Commodore key with numbers 1–8 lets you access all of the computer's 16 colors. A few other special features are also present, like the home and clear-home keys. Finally, Ctrl/W will allow you to save the screen (bitmap plus color in Doodle! format), and Ctrl/R will load it back in.

```
10 REM WRITE ON C128 HIRES SCRE
   EN                     :REM*16
20 REM BY LRW RUN MAGAZINE
                          :REM*237
30 FOR I=0 TO 63:READ A:POKE I+
   3584,A:NEXT            :REM*204
40 DIM CO(16):FOR I=0 TO 15:REA
   D CO(I):NEXT           :REM*222
50 TRAP 300               :REM*189
60 COLOR 0,1:CF=2:COLOR 1,CF
                          :REM*31
70 GRAPHIC1,1             :REM*204
80 MOVSPR 1,24,50         :REM*82
90 SPRITE 1,1,2,1,0,0,0:REM*139
100 X=0:Y=0:SX=24:SY=50 :REM*19
110 GET A$:IF A$=""THEN 110
                          :REM*212
120 IF A$=CHR$(23) THEN GOSUB 3
    20                    :REM*52
130 IF A$=CHR$(18) THEN GOSUB 3
    60                    :REM*87
140 TC=PEEK(211):IF(TCAND6)<>0
    THEN BEGIN:A=ASC(A$):FOR J=
    0 TO 15:IF CO(J)=A THEN CF=
    J+1                   :REM*86
150 NEXT:BEND             :REM*238
160 COLOR 1,CF            :REM*211
170 IF (A$>CHR$(31) AND A$<CHR$
    (128)) OR A$>CHR$(159) THEN
     260                  :REM*38
180 IF A$=CHR$(13) THEN X=0:SX=
    X*8+24:Y=Y+1:SY=Y*8+50:IF Y
    >24 THEN Y=0:SY=Y*8+50
                          :REM*207
190 IF A$="{CRSR DN}" THEN Y=Y+
    1:SY=Y*8+50:IF Y>24 THEN Y=
    0:SY=Y*8+50           :REM*247
200 IF A$="{CRSR UP}" THEN Y=Y-
    1:SY=Y*8+50:IF Y<0 THEN Y=2
    4:SY=Y*8+50           :REM*187
210 IF A$="{CRSR RT}"THEN X=X+1
    :SX=X*8+24:IF X>39 THEN X=0
    :Y=Y+1:SY=Y*8+50:IF Y>24 TH
    EN Y=0:SY=Y*8+50      :REM*18
220 IF A$="{CRSR LF}"THEN X=X-1
    :SX=X*8+24:IFX<0 THENX=39:Y
    =Y-1:SX=X*8+24:SY=Y*8+50:IF
    Y<0 THEN Y=24:SY=Y*8+50
                          :REM*202
230 IF A$="{HOME}" THEN X=0:Y=0
    :SX=24:SY=50          :REM*33
240 IF A$="{SHFT CLR}" THEN GRA
    PHIC1,1:X=0:Y=0:SX=24:SY=50
                          :REM*103
250 MOVSPR 1,SX,SY:GOTO 110
                          :REM*110
260 CHAR 1,X,Y,A$         :REM*151
270 X=X+1:SX=X*8+24:IF X>39 THE
    N X=0:Y=Y+1:SX=X*8+24:SY=Y*
    8+50:IF Y>24 THEN Y=0:SY=Y*
    8+50                  :REM*12
280 MOVSPR 1,SX,SY        :REM*15
290 GOTO 110              :REM*99
300 SPRITE 1,0:GRAPHIC0 :REM*84
310 END                   :REM*183
320 SPRITE 1,0            :REM*123
330 IF A$=CHR$(23) THEN BEGIN:G
    RAPHIC0:SCNCLR:INPUT"NAME T
    O SAVE THIS BY: ";NM$
                          :REM*86
340 BSAVE (NM$),B0,P7168 TO P16
    381                   :REM*252
350 GRAPHIC1:SPRITE 1,1:RETURN
                          :REM*205
360 SPRITE 1,0            :REM*163
370 IF A$=CHR$(18) THEN BEGIN:G
    RAPHIC0:SCNCLR:INPUT"NAME O
    F SCREEN TO LOAD: ";NM$
                          :REM*160
380 BLOAD (NM$),B0,P7168 :REM*2
390 GRAPHIC1:SPRITE 1,1:RETURN
                          :REM*20
400 DATA 231,0,0,129,0,0,0,0
                          :REM*164
410 DATA 0,0,0,0,0,0,0,0
                          :REM*107
420 DATA 0,0,129,0,0,231,0,0
                          :REM*240
430 DATA 0,0,0,0,0,0,0,0
                          :REM*159
440 DATA 0,0,0,0,0,0,0,0
                          :REM*149
450 DATA 0,0,0,0,0,0,0,0
                          :REM*131
460 DATA 0,0,0,0,0,0,0,0
                          :REM*185
470 DATA 0,0,0,0,0,0,0,0
                          :REM*183
480 DATA 144,5,28,159,156,30,31
    ,158,129              :REM*163
481 DATA 149,150,151,152,153,15
    4,155                 :REM*128
```

Q *I'm writing a program on my C-64 and would like to know how to enter the cosine formula for the trigonometric solution of a triangle when the three sides are known:* $\cos A = (b^2 + c^2 - a^2)/2bc$. *Suppose the sides a, b and c are 8, 9 and 10, respectively.*

—C. J. ERKER
CLEVELAND, OH

A To employ trigonometric formulas (or any other mathematical expressions) in a program, you'd use Basic 2.0 syntax. For the example you give, you'd enter:

```
10 A = 8:B = 9:C = 10
20 CA = (B↑2 + C↑2 − A↑2)/(2*B*C):REM CA
   EQUALS COS A
30 PRINT "COS A = ";CA ■
```

Do you have a problem or question about your Commodore computer system, software or programming? Send your questions to:

Commodore Clinic
RUN Magazine
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Peterborough, NH 03458

Queries are answered only through this column, and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

From p. 11.

$4C0 Device Number Changer

Most computerists who use a 1541 as a second drive aren't too anxious to fiddle with the wiring in order to give it a different, permanent device number. Here's an alternative command that temporarily changes the device number through software:

```
PRINT#15,"M – W"CHR$(119)CHR$(0)CHR$(2)CHR$(new device
# + 32)CHR$(new device # + 64)
```

Although you may use any device number from 8 to 30, most software recognizes only device numbers 8, 9, 10 and 11.

—Bill Doyle, Copperas Cove, TX

$4C1 Alternative Write-Protect Tabs

If you use peelable address labels, cut a few into eight equal parts. You'll have a small supply of write-protect tabs for your disks.

—Hal Scheidt, Bremerton, WA

$4C2 Magical C-128 Messages

Making program instructions appear on the C-128's screen is easy using Print statements, but the following program offers a better way. Experienced programmers will note that most of the lines are illegal and normally would grind a program to a halt faster than you can say "Syntax error." However, running the program lists the lines without line numbers so they aren't executed.

```
0 REM MAGIC C-128 MESSAGES - KEVIN QUINN
                                   :REM*19
10 Q$=CHR$(147)+CHR$(17)+CHR$(17)   :REM*9
20 PRINTQ$:POKE24,37:LIST 30-50:POKE24,27:
   GOTO 60                         :REM*22
30 LINES 10 & 20 GIVE YOU A NEW WAY TO
                                   :REM*56
40 LIST MESSAGES TO THE SCREEN. PRESS
                                  :REM*194
50 ANY KEY TO CONTINUE...         :REM*121
60 GETKEYA$:PRINTQ$:POKE 24,37:LIST70-:POK
   E 24,27:END                     :REM*72
70 YOU'RE CERTAIN TO FIND THIS PROCESS
                                  :REM*152
80 OF WRITING SCREEN INSTRUCTIONS EASY
                                  :REM*234
90 TO USE.                        :REM*159
```

—Kevin Quinn, Interlaken, NJ

$4C3 40/80 Auto Toggle

Commodore 128 users will enjoy this remarkable Magic trick. After loading and running this program, press ESC X to switch from 80- to 40-Column mode and automatically place the computer into Slow mode. Press ESC X again to enter 80-Column and Fast modes.

```
0 REM ESC-X ENHANCEMENT - LARRY S. ROBERTS
                                  :REM*118
10 FOR AD=3072 TO 3104:READ DA:POKE AD,DA:
   CS=CS+DA:NEXT AD               :REM*242
20 IF CS<>3769 THEN PRINT"ERROR IN DATA":E
   ND                               :REM*8
30 SYS 3072                       :REM*139
40 DATA 120,169,13,141,20,3,169,12,141,21,
   3,88,96,165,215,201,128,240    :REM*120
50 DATA 6,32,196,119,76,101,250,32,179,119
   ,76,101,250,255,32             :REM*129
```

—Larry S. Roberts, Casselberry, FL

$4C4 C-128 Sequential File Viewer

You can easily view the contents of any sequential file using a C-128 and a disk drive. Just enter the following:

```
10  DOPEN#1,"filename":DO:GET#1,A$:PRINTA$;:LOOP UNTIL
    A$ = ""OR A$ = CHR$(199):CLOSE1:END
```

For the best screen viewing, use 80-Column mode. Of course, you'll have to substitute the name of the sequential file for "filename" in the listing. Use the Commodore logo key to slow list scrolling and the no-scroll key to pause the program.

—Rob Kennedy, Winnipeg, Manitoba, Canada

$4C5 Every Which Way but Loose

Commodore printers produce left and up arrows and no others. The following program lets your Commodore-compatible printer produce arrows that point in any of eight directions. In either 64 or 128 mode, you'll be able to print arrows that point up, down, left and right, and also arrows that point 45 degrees from the horizontal axis. You can modify the program to place any combination of arrows anywhere you want.

```
0 REM ARROW PRINTER - JOE CHARNETSKI
                                  :REM*205
10 A$=CHR$(129):B$=CHR$(130):C$=CHR$(134):
   D$=CHR$(136):E$=CHR$(138)       :REM*79
20 F$=CHR$(144):G$=CHR$(8):H$=CHR$(146):I$
   =CHR$(158):J$=CHR$(160)        :REM*120
30 K$=CHR$(164):L$=CHR$(168):M$=CHR$(176):
   N$=CHR$(188):O$=CHR$(15)         :REM*0
40 A$="{UP ARROW}":A2$=G$+CHR$(192)+J$+H$+
   E$+C$+I$+O$                     :REM*97
50 A3$=G$+D$+D$+D$+CHR$(170)+CHR$(156)+D$+
   O$:A4$=G$+A$+B$+K$+L$+M$+N$+O$ :REM*237
60 A5$=G$+CHR$(128)+F$+J$+CHR$(255)+J$+F$+
   O$:A6$=G$+N$+M$+L$+K$+B$+A$+O$ :REM*107
70 A7$="{LEFT ARROW}":A8$=G$+I$+C$+E$+H$+J
   $+CHR$(192)+O$                 :REM*133
80 OPEN4,4,7:PRINT#4,A8$" "A1$" "A2$:PRINT
   #4,A7$"{3 SPACEs}"A3$          :REM*207
90 PRINT#4,A6$" "A5$" "A4$:CLOSE4 :REM*205
```

—Joseph Charnetski, Dallas, PA ■

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MEGA-MAGIC

Here's a convenient subroutine that creates medium-resolution graphics and enlarges letter characters.

MEDIUM RESOLUTION GRAPHICS AND CHARACTER ENLARGER

Medium Resolution Graphics and Character Enlarger (Listing 1) is a handy, interrupt-driven subroutine that turns the C-64's text screen into an 80×50 matrix on which you can plot (or erase) points to create your own graphics, and you can enlarge letters and keyboard graphics up to 16 times normal size. The utility also displays text and graphics together.

To plot or erase a point anywhere on the grid, enter:

SYS49152,X,Y,DF,COLOR

where SYS49152 executes the program, X,Y are the x and y coordinates of the grid, DF is the draw flag that plots (use 1) or erases (use 0) a point. COLOR can be any value from 0–15. For instance, SYS49152,32,12,1,7 puts a yellow point at coordinates 32,12.

Plotted points are in the foreground color. Because of color RAM limitations, any points occupying the same cursor block will be of one color; otherwise you can plot all 16 colors on the screen.

Coordinates originate in the upper-left corner of the screen (0,0). The upper-right corner coordinates are (79,0), the lower-left corner is (0,49), and the lower-right corner is (79,49).

The Character Expander routine makes letters or keyboard graphics 16 times normal size. You execute the routine with:

SYS49155,X,Y,COLOR,CHARCODE,DF

Again, X,Y are the screen locations, with X ranging from 0–39 and Y ranging from 0–49. COLOR and DF are used the same way as in the plot command. CHARCODE is the screen Poke value for the character, *not* the ASCII value. See the demo program (Listing 2) for examples of using the routine.

—ROGER MOORE, OAK RIDGE, TN

Listing 1. Medium Resolution Graphics and Character Enlarger program.

```
0 REM MEDIUM RESOLUTION SOLUTION - ROGER M
  OORE                              :REM*80
10 FORT=49152 TO 49729:READ D:POKET,D:CK=C
   K+D:NEXT                        :REM*153
20 IF CK<> 70574THENPRINT"ERROR IN DATA...
   ":END                            :REM*47
30 DATA 76,6,192,76,24,193,32,253,174,32,2
   35,183,142,24,194,165,20,141,23:REM*120
40 DATA 194,32,253,174,32,235,183,142,72,1
   94,165,20,141,44,194,173,134,2 :REM*149
50 DATA 141,71,194,173,72,194,141,134,2,16
   9,1,141,75,194,56,32,240,255    :REM*222
60 DATA 140,73,194,142,74,194,173,23,194,2
   01,80,16,10,173,24,194,201,50     :REM*0
70 DATA 16,3,76,79,192,96,169,0,141,68,194
   ,162,2,173,23,194,24,106,144,3    :REM*8
80 DATA 142,68,194,141,66,194,173,24,194,2
   4,106,144,10,72,173,68,194,9,1 :REM*154
90 DATA 141,68,194,104,141,67,194,169,0,13
   3,254,162,8,10,38,254,14,67,194   :REM*4
100 DATA 144,8,24,109,61,194,144,2,230,254
    ,202,208,237,133,253,165,254  :REM*165
110 DATA 24,105,4,133,254,174,68,194,189,6
    2,194,141,68,194,172,66,194    :REM*49
120 DATA 177,253,141,25,194,162,15,189,45,
    194,205,25,194,240,3,202,208  :REM*232
130 DATA 245,173,44,194,208,44,173,68,194,
    73,255,141,68,194,138,45,68    :REM*87
140 DATA 194,170,189,45,194,145,253,173,75
    ,194,201,0,240,18,173,71,194   :REM*87
150 DATA 141,134,2,172,73,194,174,74,194,1
    69,0,24,32,240,255,96,138,13  :REM*237
160 DATA 68,194,170,189,45,194,145,253,169
    ,212,24,101,254,133,254,173   :REM*248
170 DATA 134,2,145,253,173,75,194,201,0,24
    0,18,173,71,194,141,134,2,172 :REM*251
180 DATA 73,194,174,74,194,169,0,24,32,240
    ,255,96,32,253,174,32,235,183  :REM*63
190 DATA 165,20,141,69,194,142,70,194,32,2
    53,174,32,158,183,142,72,194  :REM*212
200 DATA 32,253,174,32,235,183,165,20,141,
    25,194,142,44,194,173,134,2   :REM*199
210 DATA 141,71,194,173,72,194,141,134,2,5
    6,32,240,255,140,73,194,142,74:REM*145
220 DATA 194,172,69,194,174,70,194,169,0,2
    4,32,240,255,169,0,141,75,194 :REM*132
230 DATA 56,32,240,255,140,42,194,142,43,1
    94,173,42,194,201,40,48,6,56  :REM*220
240 DATA 233,40,141,42,194,173,42,194,10,1
    41,23,194,173,43,194,10,141,24:REM*237
250 DATA 194,162,8,169,0,133,252,162,8,10,
    38,252,14,25,194,144,8,24,109 :REM*173
260 DATA 22,194,144,2,230,252,202,208,237,
    133,251,173,24,208,201,21,240 :REM*184
270 DATA 10,165,252,24,105,216,133,252,76,
    190,193,165,252,24,105,208,133 :REM*24
```

```
280 DATA 252,120,165,1,41,251,133,1,160,7,
    177,251,153,34,194,136,16,248 :REM*204
290 DATA 165,1,9,4,133,1,88,162,0,160,8,30
    ,34,194,144,13,72,138,72,152  :REM*240
300 DATA 72,32,61,192,104,168,104,170,104,
    238,23,194,136,208,232,173,23 :REM*174
310 DATA 194,56,233,8,141,23,194,238,24,19
    4,232,224,8,208,213,173,71,194 :REM*37
320 DATA 141,134,2,172,73,194,174,74,194,1
    69,0,24,32,240,255,96,8,0,0,0 :REM*198
330 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,1,32,124,108,225,123,255,98 :REM*24
340 DATA 254,126,226,127,251,97,236,252,16
    0,40,8,4,1,2                  :REM*183
```

Listing 2. Demo program.

```
10 REM MEDIUM RESOLUTION GRAPHICS DEMO - R
   UN LISTING 1 FIRST!             :REM*194
20 PRINT"{SHFT CLR}"CHR$(14)       :REM*97
30 DIM X(100),Y(100)               :REM*205
40 POKE 53280,0:POKE 53281,0       :REM*88
50 PRINT "{HOME}{SHFT P}LOT POINTS..."
                                   :REM*134
60 FOR I=1 TO 100                  :REM*88
70 X(I)=RND(1)*80:Y(I)=RND(1)*48+2:C=RND(1
   )*16                            :REM*10
80 SYS 49152,X(I),Y(I),1,C         :REM*64
90 NEXT                            :REM*220
100 GOSUB 550                      :REM*184
110 PRINT "{HOME}...AND UNPLOT POINTS"
                                   :REM*92
120 FOR I=1 TO 100:SYS 49152,X(I),Y(I),0,0
   :NEXT                           :REM*115
130 REM DRAW LINES                 :REM*57
140 PRINT"{SHFT CLR}{HOME}{SHFT D}RAW LINE
   S...{4 SPACEs}"                 :REM*210
150 X1=0:Y1=10:X2=79:Y2=10:DF=1    :REM*108
160 D=SQR((X2-X1){UP ARROW}2+(Y2-Y1){UP AR
   ROW}2)+.5                       :REM*26
170 A=(X2-X1)/D:B=(Y2-Y1)/D:CO=INT(RND(1)*
   15)+1                           :REM*249
180 X=X1:Y=Y1:FOR I=0 TO D         :REM*161
190 XR=X+.5:YR=Y+.5                :REM*108
200 SYS 49152,XR,YR,DF,CO          :REM*86
210 X=X+A:Y=Y+B                    :REM*100
220 NEXT                           :REM*95
230 GOSUB 550                      :REM*63
240 PRINT"{SHFT CLR}{HOME}{SHFT D}RAW CIRC
   LES...{2 SPACEs}"               :REM*111
250 XC=40:YC=25:XR=20:YR=12:SA=0:EA=360:RT
   =0:AN=10:DF=1                   :REM*193
260 R={PI}/180:TP=-{PI}/2          :REM*217
270 SA=SA*R:EA=EA*R:RT=RT*R:AN=AN*R:IF EA<
   SA THEN AN=-AN                  :REM*177
280 SC=SA+RT+TP:EC=EA+RT-AN+1E-8+TP:CO=INT
   (RND(1)*15)+1                   :REM*247
290 FOR C=SC TO EC STEP AN         :REM*152
300 X1=XC+XR*COS(C):Y1=YC+YR*SIN(C):REM*28
310 X2=XC+XR*COS(C+AN):Y2=YC+YR*SIN(C+AN)
                                   :REM*248
320 D=SQR((X2-X1){UP ARROW}2+(Y2-Y1){UP AR
   ROW}2)+.5                       :REM*187
330 A=(X2-X1)/D:B=(Y2-Y1)/D        :REM*196
340 X=X1:Y=Y1:FOR I=0 TO D         :REM*2
350 XP=X+.5:YP=Y+.5                :REM*228
360 SYS 49152,XP,YP,DF,CO          :REM*220
370 X=X+A:Y=Y+B:NEXT:NEXT          :REM*7
380 GOSUB 550                      :REM*209
390 PRINT "{SHFT CLR}{HOME}AND CREATE TEXT
   ...":FOR T=1 TO 2000:NEXT:PRINT"{SHFT
   CLR}"                           :REM*231
400 SX=1:B$="{SHFT G}REETINGS":CO=5:SY=0:G
   OSUB 480                        :REM*107
410 SX=1:B$="FROM YOUR":CO=2:SY=4:GOSUB 48
   0                               :REM*92
420 SX=1:B$="{SHFT C}OMMODORE!":CO=6:SY=8:
   GOSUB 480                       :REM*229
430 SX=0:B$="{SHFT E}XAMINE MY":CO=3:SY=12
   :GOSUB 480                      :REM*165
440 SX=0:B$="VERY LARGE":CO=1:SY=16:GOSUB
   480                             :REM*7
450 SX=10:B$="TEXT!":CO=7:SY=20:GOSUB 480
                                   :REM*30
460 GET KE$:IF KE$="" THEN 460     :REM*151
470 PRINT"{SHFT CLR}":END          :REM*31
480 FOR I=1 TO LEN(B$)             :REM*138
490 L$=MID$(B$,I,1)                :REM*168
500 A=ASC(L$):IF A<64 THEN 520     :REM*151
510 A=ASC(L$)-64:IF A>127 THEN A=A-64
                                   :REM*68
520 SYS 49155,SX,SY,CO,A,1         :REM*95
530 SX=SX+4                        :REM*154
540 NEXT:RETURN                    :REM*184
550 PRINT"{HOME} PRESS A KEY...{22 SPACEs}
   "                               :REM*49
560 GET A$:IF A$="" THEN 550       :REM*208
570 RETURN                         :REM*202
```

■

TELECOMPUTING WORKSHOP

Safeguard your passwords and other personal information to prevent theft or worse.

By LOREN LOVHAUG

WHEN HISTORIANS LOOK BACK on the 1980s, I believe that they'll deem it the Protect Yourself decade. It's an era in which sexually transmittable diseases, vigilante justice and terrorism dominate the headlines. It probably seems strange to extend this "protect yourself" doctrine into the telecomputing domain, but we must beware of those dangers lurking in the neighborhood of our modem. The issues that I raise here are quite serious, but please don't let these concerns dissuade you from telecommunicating. Instead, let them guide you to better and safer telecommunications experiences.

WHAT'S THE SECRET WORD?

Most national telecommunications networks and local BBSs use a password identification system to maintain confidentiality and protect against unauthorized access. A typical log-in scenario involves typing your name and some kind of password before being granted entry to the system. Regardless of whether or not you are doing the typing, the computer you are communicating with *thinks* that you are using the system. In light of this, you should take great care when choosing your password, and change it periodically.

This is particularly important in the case of telecommunications networks that charge access fees based upon the amount of time spent online. If someone were to obtain your password, it's conceivable that they could run up a huge bill for online time that you would have to pay for.

Beyond the serious financial implications, if your password fell into the hands of an unscrupulous individual, he or she could also gain entry to your private electronic mail and be able to post public messages in your name. I can tell you from personal experience that it's very distressing to log on to a BBS and read messages written by your ghostwriter, especially when their intent is to hurt or embarrass you.

Here are a few simple measures to help you guard your passwords:

1. When choosing a password, never use words that can easily be associated with you. While your spouse's or children's names, your street address or telephone number are all easy to remember, they are also quite simple to recognize. If you have trouble recalling passwords, invest in a terminal package that has a phonebook feature that can store and remember passwords for you.

2. Never duplicate passwords on different systems or rotate passwords among systems. There are some SYSOPs who steal passwords by examining their system's user file. Armed with the password list from their own BBS, they dial up other systems and try various passwords until they're successful. There are even SYSOPs who actively compare notes with other SYSOPs with the intent of stealing user's passwords.

3. When you are telecommunicating, always be wary of others around you. It's very easy for someone to watch your video display or your fingers as you log on to a BBS or network. If you've telecommunicated in front of others—for example, if you've given a demonstration at a user's group meeting—it's usually a good idea to change your passwords.

4. Never share a password with anyone. Although this may be tempting in the case of expensive national networks, for every person that knows your password, the chances are doubled that it will be stolen.

ONE BAD APPLE

SYSOPs of local bulletin board systems are people who've decided to dedicate their computer equipment and the expense of monthly phone service to the operation of a BBS. In most cases, these people absorb the costs because they enjoy communicating via computers and sharing data and information. However, you should be careful because there are a few whose motives are less noble.

When accessing a BBS for the first time, a user is often asked to fill out an online questionnaire. What kind of computer equipment do you own? What is your address? At what times can you be contacted? These are typical queries. The motivation for the vast majority of SYSOPs is simple curiosity about the people who are accessing their system.

Unfortunately, there have been cases where information gathered from BBSs has been used to construct "hit lists" for criminals looking to steal computer equipment. From these innocent inquiries, the thieves are provided with detailed inventories and knowledge about when potential victims are not at home.

Some BBSs, especially those affiliated with businesses, might use the data to construct mailing lists either for their own use or to sell to other businesses. If you're a person who doesn't like to be contacted by salespeople or to receive advertisements through the mail, you might want to think twice about how you answer various questions.

When filling out electronic questionnaires, protect yourself by keeping one thought in mind: "Why would the SYSOP want or need to know such information?" Again, in most cases, you're dealing with a simple desire to know more about the people using his or her BBS. But, if you don't personally know a SYSOP, I don't see any reason to give him or her your home address, especially upon initially accessing a system. As an alternative, you could just divulge your state/city. That way, you give the SYSOP an idea of where you're calling from without jeopardizing your property or safety.

Another kind of SYSOP you should be wary of is the software pirate. His or her BBS is a vehicle for the illegal copying and distributing of software. Some pirate SYSOPs take a more subtle, but just as unethical, approach by providing electronically reproduced documentation for downloading.

The reason such BBSs and SYSOPs should be avoided is twofold. First, software theft is a crime, punishable by law. As a user of these systems, you could be considered an accomplice to a crime. Second, by using a BBS run by a SYSOP who condones software piracy, you're sending a non-verbal message to him and other users of the BBS that you either excuse the activity or don't care about the issue of software theft.

The software piracy problem in the Commodore world threatens further software development for our machines. Avoiding thieving BBSs and encouraging others to help the C-64 and 128 software market remain healthy for continued development is the best way to combat this problem. After all, it's no fun running a BBS that no one calls!

Most SYSOPs are honest folk who run "clean" BBSs. You can help them stay that way by letting them know if someone has uploaded a commercial file to their system. As a SYSOP myself, I can tell you that it's not always easy to keep track of what users are up to.

HELD HOSTAGE

It's also important to protect yourself when downloading programs because of an increasingly popular, yet evil, fad that I call "computer terrorism." Computer terrorism is committed by people who write and distribute programs designed to wreak havoc with others' computer data and equipment.

The most common way to accomplish these dastardly feats is via the Trojan Horse method. On the surface, a Trojan Horse program appears to be a harmless game, music demo or utility, while in reality its mission is to inflict damage. Trojan Horses often attack floppy disks, causing your disk drive to automatically format the disk you're using or destroy random sectors on it.

Another type of terrorist program is called the Time Bomb. Like the Trojan Horse, the Time Bomb is usually disguised as some benign program. But while presenting this facade, it's actually keeping track of the amount of time that has passed or the number of times since the program was first executed, waiting for a predetermined or random moment to execute its damage.

The last form of terrorist program is known as a Virus. A Virus program, unlike a Time Bomb or a Trojan Horse, is designed to do nothing but hide itself away in your computer or disk drive. It waits to copy itself onto other programs on disk and thereby continuously spread itself before actually causing any damage.

The popular myth is that terrorist programs can only be created for computers with disk-based operating systems like the Amiga or IBM PC, but this is not true. In fact, the C-64 and 128 are perhaps even more likely victims because their intelligent disk drives allow programs to be stored and executed totally within the drive itself.

With this in mind, here are a few downloading tips to help you avoid the effects of terrorists' programs:

1. Never download or test a downloaded program with a disk that contains important data. It's always best to start a new download session with a fresh disk.

2. When testing a downloaded program, be alert and look for signs of mischief—random disk drive action or disk drive activity that resembles disk formatting—while the program is running.

3. Look for file descriptions, commentaries and recommendations from other users before you download any program.

4. Avoid programs with descriptions that sound too good to be true: "Transform your C-64 or 128 into a Cray Super Computer!" Such wild declarations are often just an enticement for you to become a victim.

Good Luck! It is my sincere hope that these suggestions will help you avoid the few pitfalls in the otherwise wonderful world of telecomputing. ■

Loren Lovhaug is a programmer and writer with lots of telecommunications experience. Along with being SYSOP of Q-Link's C-128 Special Interest Group and co-SYSOP of GEnie's Commodore Flagship, he publishes Twin Cities 128, *a newsletter for C-128 users. You can write to him care of:*

Telecomputing Workshop
RUN Magazine
80 Elm St.
Peterborough, NH 03458

You can also send him electronic mail on Q-Link (LOVHAUG) or GEnie (Sparrow.J).

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GEOWATCH

Here's an invitation to venture into the world of geoWrite Workshop 128.

By MARTE BRENGLE

WITH THE INTRODUCTION of the C-128 version of geoWrite Workshop (gWW), Berkeley Softworks (BSW) has brought their word processing software more in line with the full-featured programs that C-128 users are used to.

Due to some major improvements, gWW 128 has many good points. However, there are problems with the manual's instructions right from the start.

INSTALLATION

The program's directions give the impression that gWW 128 can be installed on either a GEOS 128 or a GEOS 64 boot disk. *None* of BSW's 128-only programs can be run from the GEOS 64 Kernal. There are various programs that let you correct installation mistakes, but none that are available from, or sanctioned by, BSW. Moreover, most software dealers won't let you return a program that's been opened, so be sure that you don't make the mistake of trying to install a program you can't use.

The installation process on a GEOS 128 boot disk is not without some problems. In the first place, all GEOS 128 add-on programs *must* be installed using a 1541 disk drive or a 1571 configured to act like a 1541. But the gWW 128 manual doesn't mention this fact, and the unaware 1571 user will be told that the disk can't be installed. Configuring the 1571 as a 1541, installing the program and then restoring the 1571 to its Native mode solves the problem, but one wonders why BSW has such a long-lasting love affair with the 1541 that even their 128-mode programs require it.

THE PROGRAM

There are three ways to enter geoWrite from the deskTop. Most people simply double-click on the icon; others go through the extra step of choosing Open from the File menu. Another group, with geoWrite documents already on disk and the geoWrite program present, double-click on any particular document's icon.

If the file you open was created with an earlier version of geoWrite—the 1.3 version that comes with the GEOS boot disk, for example—it automatically converts to gWW 128 format, version 2.1. Nowhere, however, are you warned that this conversion will forever prevent any previous version of the program from reading that file.

Each upgrade to geoWrite has been incompatible with previous versions, so if you think you'll want to read your documents with geoWrite 1.3 or 2.0, make sure you copy your file first and then *open only the copy*. Keep this incompatibility factor in mind if you're creating files to upload to BBSs or to any of the national networks, or if you're writing an instruction file for a program you'll be sharing with others.

As with any word processing program, gWW 128 doesn't allow you to see your entire document on the screen all at once, although the screen, or writing window, as BSW refers to it, is 80 columns wide. Since the 80-column screen does cause some vertical distortion, some people may find some fonts difficult to read. I do, so I prefer, when working with custom fonts, to first use the BSW 128 font to see what I'm doing, and then re-font prior to printing. This is slow with a 1541 or 1571, but not so bad with a RAM disk.

Fortunately, using the same font throughout the document is easier in gWW 128 than in earlier versions. Clicking Select Page from the Options menu, or pressing the Commodore logo and V keys together and choosing your font and point size, refonts the entire page.

Since there are two resident fonts in gWW 128, rather than only the one in GEOS 64, you're limited to six fonts of your own choosing. Also, due to a quirk in some of the GEOS 128 font buffers, you might have problems using some of the large fonts like Superb or FontKnox. It appears to depend on what version of gWW you have. In any case, when working with the larger fonts, proceed with caution and remember to make a back-up copy of your file before you attempt to introduce a large font into your document.

Another annoyance derives from the fact that, as with all GEOS programs, you're using a graphics environment and a graphics-oriented screen. This means that the writing window doesn't shift smoothly—a quirk that BSW hasn't been able to eliminate. Word wrap is slow, and rapid typists might lose letters as the writing window shifts position. While it's shuffling itself around, geoWrite Workshop 128 *usually* does a good job of remembering what you've typed.

Finally, BSW notes that the document dimensions referred to in the manual are geared strictly to the use of 80-dpi printers; the program has only limited support of printers with resolutions other than 80 dpi.

GETTING AROUND

To move rapidly from one part of a page to another, you can follow the instructions for clicking inside the Page Indicator at the top of the screen, or simply double-click in the Page Indicator where you want the window to be. To go to the next page or the previous page, it's much faster to use the command keys (Commodore/+ or Commodore/back arrow) rather than go through the menus. In fact, the easiest way to handle any gWW 128 document is to copy it into the RAM expansion unit and work with it entirely in memory. All GEOS programs are extremely disk-intensive—you'll be amazed at the difference RAM disk access makes.

The instructions say that you can place the cursor anywhere on the page. That's not quite true: You can place the cursor at any point on a page where you've already typed something. This impediment can be circumvented by employing the tab key. If you use the pointer to place a tab stop at the position where you want to enter something—a title, an indented heading, or whatever—that doesn't start at the left margin, you can tab right over to it, rather than using the space bar, which moves the cursor at a snail's pace.

FORMATTING DOCUMENTS

If, because you want to change margin settings or paragraph indentation, you follow the manual's directions for moving the M or P on the Ruler, your changes take place only in the paragraph in which the cursor is located. If you want to make global changes, you first have to select the sections you wish to change. This can be as simple as placing the cursor at the beginning of a section, holding the mouse button down and moving to the end of a section; or as slow as selecting every page in a document—one page at a time—and making the changes. If you frequently make major formatting changes in lengthy documents, you'll find this to be a serious shortcoming.

Another pitfall is that you can only create one set of headers and footers per document. If you establish them for page one and change them to something else on page four, for example, your original settings are wiped out.

Unfortunately, the manual's descriptions for the Cut, Copy and Paste functions are also unclear. The most important part somehow got inserted into the middle of the instructions for setting the paragraph margins. When you cut something from a document, that section disappears into a text scrap. If you don't want to do that, make sure you employ Copy instead of Cut. However, if you accidentally use Cut, you can always exercise Paste to put your scrap back in place. ■

For space reasons, we cannot publish all of this discussion of gWW in one issue. It will be concluded in September.

—Editors

Marte Brengle, author of the Sixth Sense 128 *manual, has spent a lot of time with Commodore special interest groups on national networks. You can contact her on Q-Link as Sunny G.*

Send your questions on GEOS to: geoWatch, RUN Magazine, 80 Elm St., Peterborough, NH 03458.

COMMONSENSE APPROACH TO COMPUTING

1. The best arrangement for your computer system is to plug your components into a power strip, which you should shut off when not using your computer. If you don't have a power strip, be sure to always unplug your power supply when you're not using your computer. Even though your computer is off, your power supply can overheat.

2. Water can destroy data on your disk. Avoid storing your disks in excessively humid conditions. Also avoid extremes of hot and cold, which may distort or compromise the reliability of the data on your disk. Try to keep 'em at room temperature.

3. To keep your disk drive from overheating, raise it to allow air to circulate under and over it. To cool off their drives, computerists have devised many different methods—for example, spent bullet shells or sawed-off pencils in the drive's screw holes, fans directed at the unit or paper chimneys over the drive's vents!

4. If you spend a lot of time in front of your computer monitor, you run the risk of eyestrain. Get an anti-glare shield, which will also protect you from radiation and eliminate static shock. Staring at a computer screen a lot can also cause headaches, fatigue, irritability and facial twitches. Here are some things you can do:
—take a visual break every 20 minutes. Focus on different distances.
—if you don't have an anti-glare shield, make sure there are no bright lights reflecting off the screen and into your eyes. Also, don't locate your computer by, or directly in front of, a window. The contrast between the outside brightness and the low-level lighted screen can cause eyestrain.
—according to optometrists, green letters on a green screen is the worst combination for your eyes; amber screens are better; but black-and-white screens are best.

5. Sitting for long hours in front of your monitor can also cause back, neck and shoulder strain; slow blood circulation in the legs; and slacken muscle tone. An ergonomically designed chair can minimize these health hazards and muscular aches. Also, constantly changing your sitting position and good body posture with feet firmly on the floor can help. ■

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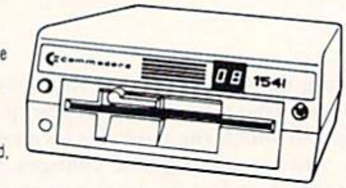

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Works with modems and communications software	**YES**	NO	NO	NO	NO
Requires additional cabling between computer & drive(s)	**NO!**	YES	YES	YES	YES
Available for 1541-II, 1571, 1581, FSD-1&2, MSD-1&2	**YES**	NO	NO	NO	NO
Can be installed on dissimilar drives (i.e. 1541/1571/1581)	**YES**	NO	NO	NO	NO
Simple ROM installation - no additional hardware	**YES**	NO	NO	NO	NO
Allows proper replacement of interference shielding	**YES**	NO	?	?	?

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HARDWARE GALLERY

What's faster than a speeding disk drive, able to load tall files in a single bound?

Compiled by BETH S. JALA

WARP SPEED................A

Warp Speed's the Name, Acceleration's the Game!

A rendezvous with the Cinemaware staff earlier this year gave me the opportunity to witness a sneak preview of their Warp Speed cartridge. Using a 1541 and a Warp Speed-equipped C-64, they demonstrated the unit's ability to load and display graphic screens at a rate of speed that almost matched that of a 1571/C-128 combination. In fact, the load times were so rapid that I had difficulty believing that their 1541 wasn't actually a 1571.

As I watched this cartridge perform a variety of amazing feats, not the least of which were these high-speed loading exercises, an important question came to mind. Would these high-speed disk operations be compatible with the dizzying variety of hardware and copy-protected software configurations found in the real world? Read on and decide for yourself.

Fast and compatible: two key words that describe Warp Speed.

C-64 AND C-128 COMPATIBLE

When a production model of Warp Speed arrived for review six weeks later, I began a series of tests to try to reveal its limitations. My initial impression was that if improving the 1541's disk access times was all the cartridge could accomplish, I would probably recommend it as a wise investment to most C-64 users. However, it offers considerably more than fast loading times; Warp Speed is a rarity because it gives users a cartridge that's compatible with both the C-64 *and* the C-128.

Warp Speed differs in appearance from most other cartridges. A toggle switch on top lets C-128 users choose between 64 and 128 modes. Located next to that switch is a reset button that can re-activate the cartridge if it becomes disabled. While most operations won't disable Warp Speed, you can deactivate it by using the SYS 64738 command in 64 mode or SYS 16384 in 128 mode.

Plugging the cartridge into the expansion port of either computer gives you a full set of Commodore's DOS wedge commands. Besides those one-key commands, some other keys perform newly assigned tasks. There's the pound (#) sign, for toggling between 8 and 9 as the default disk drive; the ampersand (&) command, for viewing word processing (sequential) files on the screen; and the pi (π) sign, which takes you to the ML monitor.

Warp Speed adds a transparent, 64- and 128-mode, menu-driven disk system that's accessed by pressing the British pound sign (£). Nine options within the menu offer rudimentary disk functions, such as displaying the directory, as well as more sophisticated features, like a single- and dual-drive copier utility, a disk-sector editor and a full-featured machine language monitor.

More good news abounds outside of the menu system. Activating the cartridge causes every file loaded from Basic to have a Warp Load performed on it. This process, whether done in 64 or 128 mode, causes the words "Warp Loading" to appear, followed by starting and ending addresses of the file being loaded.

COPY-PROTECTION COMPATIBILITY

Software compatibility is always foremost in my mind when evaluating fast-load cartridges, so I tried using the Warp Loading feature on every copy-protected software package I could get my hands on. While all the programs I tested seemed to work flawlessly, I'm certain some software incompatibility must exist. Even Cinemaware wisely admits that probably *only* 99 percent of the heavily copy-protected software will work with their cartridge. I feel that, regardless of how many copy-protected titles you own, the compatibility is good enough to rule out any problems.

Table 1. Comparison of load times.

	Load times without Warp Speed	Load times with Warp Speed
C-64 or C-128 with a 1541:		
36-Block File:	25 seconds	3.5 seconds
70-Block File:	47 seconds	7.0 seconds
Stealth Mission (SubLogic)	3 minutes, 50 seconds	3 minutes, 50 seconds
Acrojet (MicroProse)	1 minute, 5 seconds	1 minute, 3 seconds

Some compatibility problems not related to copy protection do, however, become apparent when you use a 1541 to fast-load files saved with C-128/1571 disk utilities, such as Commodore's 1571 DOS Shell. At the bottom of the first page of Warp Speed's owner's manual, you'll find a paragraph that contains some ambiguous statements about how 1571 files and Warp Speed files are both saved in a skew 6 format, which results in a 1000 percent increase in loading speed. This statement is true, provided the 1571 files (either 64 or 128 mode) were saved with starting addresses that Warp Speed can use.

On the other hand, nothing is loaded into memory if you use Warp Speed's Auto Load menu in C-64 mode to load and run C-128/1571 files that were saved from addresses incompatible with the C-64. I uncovered two quick fixes for this dilemma. The first remedy is to load these files with Warp Speed disabled, then re-save the files with Warp Speed activated. While this is a bit time-consuming, bear in mind that the process only needs to be performed once. The second fix is not to use Auto Load menu with C-128-saved files. Finally, as with any Commodore fast-load cartridge, a little experimenting on the user's part will quickly determine any software's Warp Speed compatibility.

USER AND COMPUTER COMPATIBILITY

Once you begin using Warp Speed on your C-64, you'll get spoiled by the ease it brings to your life. However, C-128 owners already have at their disposal such a wide range of options coupled with fast disk access that they're unlikely to wax as enthusiastic about Warp Speed as 64 owners (unless, of course, they use a 1541 or spend a lot of time in 64 mode). After using this device for a while, most C-64 owners won't want to go back to their old cartridge or to Native mode.

Life with Warp Speed is not without its problems, though. After reading a few lively discussions about the unit on QuantumLink, I was surprised to find not everyone shared my enthusiasm. I asked Bob Jacobs, president of Cinemaware, if he was aware of any problems with the cartridge. He admitted that a top-of-memory bug exists in the cartridge, but the problem rarely, if ever, surfaces. I can attest to his claim, because I've used a veritable mountain of commercial and public domain software with Warp Speed without any problems. In fact, I've run, without difficulty, a machine language program that was 166 disk blocks (over 40K!) in length. Cimemaware still plans to offer an upgraded Warp Speed in late 1988.

All told, the Warp Speed cartridge is extraordinary. Comparing it to other fast-load cartridges is an exercise in futility; for the money, I haven't found anything that compares with it. Best of all, it goes a long way in converting the C-64 into the truly useful computer it was always meant to be. *(Cinemaware Corp., 4165 Thousand Oaks Blvd., Westlake Village, CA 91362. $49.95.)*

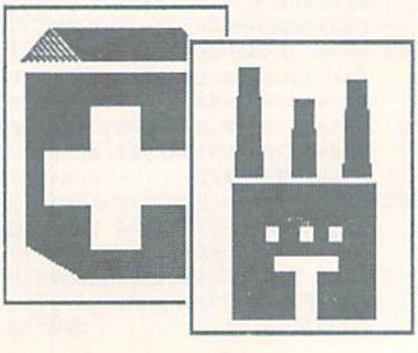
—TIM WALSH
RUN STAFF ■

From p. 41.

```
236 DATA 9A20CF8E20308F9D06C0 A
    9A18D909AA9018D919A 20CF8E2
    0308F9D0FC0A9         :REM*243
237 DATA 9F8D909A20CF8E20308F 9
    D08C0A9AA8D909A20CF 8E20308
    F9D0AC0A9008D         :REM*120
238 DATA 8F9AAC929AB9EF988D91 9
    AA9258D909AA9188D8E 9A20CF8
    E20308F9D0CC0         :REM*38
239 DATA 60A003A900999939A8810 F
    860E000F01618AD939A 6D959A8
    D939AAD949A6D         :REM*134
240 DATA 969A8D949ACAD0E66020 2
    88F38BD4E9AED939A8D 979AE8B
    D4E9AED949A0D         :REM*148
241 DATA 979A6020 2B90AE929ABD 0
    0C0AAA9F48D959AA901 8D969A2
    03690205190F0         :REM*189
242 DATA 1590062 0DD8C4C9A90AE 9
    29ABD9C9AC90490F020 E98C202
    B90A9908D959A         :REM*77
243 DATA A9018D969AAE929ABD04 C
    0AA203690AE929ABD0C C020198
    FA9648D959AA9         :REM*72
244 DATA 008D969A203690205190 F
    01F901A20058DAE929A BD9C9AD
    00CA9C88D989A         :REM*41
245 DATA BDF198AA20378F4CEB90 2
    0F78C202B90AE929ABD 0CC0201
    98FA9028D959A         :REM*36
246 DATA 203690AD939A48202B90 A
    E929ABD06C0AAA90A8D 959A203
    69018686D939A         :REM*142
247 DATA C9659002A964AE929A9D A
    09AAE929A18BD0AC07D 08C00A8
    D989AF007BDF1         :REM*230
248 DATA 98AA20378F202B90AE92 9
    ABD02C0AAA9148D959A 2036901
    8AD939A69648D         :REM*94
249 DATA 939AAD949A69008D949A 2
    0288F18BD4E9A6D939A 9D4E9AE
    8BD4E9A6D949A         :REM*143
250 DATA 9D4E9AAE929A38A90AFD 9
    E9A8D9B9A202B90AE92 9ABD04C
    0AAA9028D959A         :REM*214
251 DATA 2036902 0288F20708F20 2
    B90AE929ABD0CC02019 8FA9058
    D959A20369020         :REM*82
252 DATA 288F20708F202B90AE92 9
    ABD08C0AA38A90AED9B 9A8D959
    A20369020288F         :REM*65
253 DATA 20708F20C685C910B0F9 1
    8690F48202B90AE929A BD0AC0A
    A3868ED9B9A8D         :REM*199
254 DATA 959A2036902 0288F2070 8
    F202B90AE929A18BD9C 9A7D9E9
    A0A0A0A8D9B9A         :REM*88
255 DATA AE929ABD02C00A0A0A0A 1
    86D9B9A8D939A20288F 18A9646
    D939A8D939AAD         :REM*91
256 DATA 949A69008D949A18BD56 9
    A6D939A9D569AE8BD56 9A6D949
    A9D569A20EF92         :REM*108
257 DATA 208B92AE929AAD9B9AF0 0
    7A8DE04C088D0FAAE92 9ABD9E9
    AC903B0032053         :REM*169
258 DATA 93A9008DA29AA9068D2E 9
    A2016956 0A20018987D 0199A8A
    DA79A919BADA8         :REM*35
259 DATA 9A91A7E8E004D0EB6020 C
    989A9BF8DA79AA9088D A89AA99
    D8DAB9AA9008D         :REM*170
260 DATA 9B9AAD929AD00AA204A0 D
    8200E864CBA92A9E0A2 05A0D92
    00E86A9DB8DAC         :REM*90
261 DATA 9AA20CA000B19BCDAB9A D ►
```

```
    01620C685CDAC9A900E 8A48984
    8207392EE9B9A        :REM*236
262 DATA 68A868AAC8C01DD0DE20 D
    485CAD0D620D98960A9 7D8DAC9
    AA9A18DAB9AA9        :REM*106
263 DATA 088DA89AA9BF8DA79AA9 2
    88D7B9AA9008D7C9AAE 929ABDA
    09AF01BAD929A        :REM*127
264 DATA D01720 4893DDA09AB00E A
    900A204A0D8200E86A2 0C20C19
    260A9E0A205A0        :REM*41
265 DATA D9200E8620 4893DDA09A B
    0EEA20C20C192602 0C6 85C965B
    0F9AE929A60A9        :REM*147
266 DATA 508D7B9AA9008D7C9AAD 9
    29AD00CA953A204A0D8 200E864
    C7793A933A206        :REM*96
267 DATA A0DA200E86A9058D9B9A 2
    0EC938D939AA90D8D9B 9A20EC9
    38D949AAD939A        :REM*48
268 DATA F007AA20D485CAD0FAA9 0
    28D7B9AAD949AF007AA 20D485C
    AD0FAA000B19B        :REM*243
269 DATA C925F039C920F035A000 A
    9A1919BA90191A7C8A9 BD919BA
    90191A7A028A9        :REM*105
270 DATA A0919BA90191A7C8A9AE 9
    19BA90191A7208F94AD 929AD00
    420BB8C6020C3        :REM*238
271 DATA 8C6020C685CD9B9AB0F8 6
    0AE929A8E8602204494 A94820D
    2FF205994AE92        :REM*115
272 DATA 9ABD00C0AAA90020CDBD 2
    04E94A94120D2FF2059 94AE929
    ABD04C0AAA900        :REM*94
273 DATA 20CDBD204E94A94420D2 F
    F205994AE929ABDA09A AAA9002
    0CDBD204E9460        :REM*171
274 DATA A218AC939A1820F0FF60 A
    92020D2FFA92020D2FF 60A93A2
    0D2FF60A9008D        :REM*182
275 DATA 0CD48D05D4A9898D0DD4 8
    D06D4A95F8D08D4A99B 8D01D4A
    9068D18D4A921        :REM*14
276 DATA 8D0BD48D04D4A9208D0B D
    48D04D460A90F8D18D4 A90D8D1
    3D4A9BB8D14D4        :REM*90
277 DATA A9438D0ED4A9038D0FD4 A
    9818D12D4A9808D12D4 60A217A
    9009D00D4CA10        :REM*4
278 DATA FA6020B394A9088D03D4 A
    9408D05D4A9C08D06D4 A9818D0
    4D4A9008DA49A        :REM*25
279 DATA A90F8DA39AA94B8D01D4 6
    0ADA49AC910F00CACA4 9A988D1
    8D4C88CA49A60        :REM*194
280 DATA ADA29AF00EACA39A3009 9
    88D18D4888CA39A60A9 808D04D
    4A9008DA29A60        :REM*162
281 DATA A9058D18D4A9008D05D4 A
    9BB8D06D4A9648D00D4 A9F48D0
    1D4A9218D04D4        :REM*19
282 DATA A9208D04D46020C685C9 E
    6B00160A9008D9F95AD 1ED08D9
    F95AD9F952902        :REM*209
283 DATA C902F00160AD04D0CD06 D
    0D009AD05D0CD07D0D0 0160AD7
    89AF00EAD9F95        :REM*228
284 DATA 2904C904D005A000208F 9
    5AD799AF00EAD9F9529 08C908D
    005A002208F95        :REM*195
285 DATA 60200F8CADA29AF00160 2
    0B394205F9460000203 08020D0
    404050C060512        :REM*94
286 DATA 0807120A0B080415040E 0
    30A0415061003161203 1814050
    2140910000000F       :REM*140
287 DATA 1F3F7F003F3F1100F0F8 F
    CFE00FCAC0B3333333F 3E3E3E0
    017FCACFCFC7C        :REM*151
288 DATA 7C7C0018000066667F7F 7
    F001A00006666FEFEFE 001B0F0
    F0F0F0E0E0E00        :REM*58
289 DATA 1CF0F0F0F0707070001D 0
    0113938113811381E80 C4CE8EC
    48EC40E270011        :REM*136
290 DATA 3938113811381F181819 1
    919003F1F22000C8C8C 8C00FEF
    C231D1F1F1C1E        :REM*147
291 DATA 1E1E00245CFCFC1C3C3C 3
    C0025000103111113 39 1126000
    0800808881C08        :REM*113
292 DATA 281311D1FF7A3F1F0029 8
    90A1CFCB8F8F0002A00 033F73E
    30303032B0000        :REM*88
293 DATA F81C0E00000C2C737323 7
    3737303002D1E3F3F0C 0C0C0C0
    02F00001F7F7E        :REM*66
294 DATA 7E7E703B0000F8FE7E7E 7
    E0E3C7E7E7E6E466F7F 003E7E7
    E7E7662F6FE00        :REM*69
295 DATA 3FFFFFFFFFFFFFFFFF21 F
    FF7C1F7F7F77F3E2E0C 0C0C0C0
    C0C0C003D808C        :REM*89
296 DATA 9EBF8C8C0C0C00000003 F
    F8007FFC00F00001E00 001EFF8
    01EFFE01F7FF0        :REM*42
297 DATA 1FFFF81FE7F81FE7F81F F
    EF81FFF780FFF7803FE 780000F
    80001F003FFE0        :REM*115
298 DATA 01FFC0000000000000FF 0
    0000000000003C1E007 FFF01FF
    FF83FFFFC3FFF        :REM*51
299 DATA FE7FFFFE7FFFFE7FFFFE 7
    FFFFE7FFFFE7FFFFE7F FFFE3FF
    FFE3FFFFC1E3C        :REM*130
300 DATA 78000000000000000000 0
    0000000001000000002 0400100
    0040000000000        :REM*43
301 DATA 80404000000000000000 0
    4001000020000200000 0080400
    0000004000000        :REM*80
302 DATA 08000000000800800000 0
    8000000208080000FFFF 0080010
    08001FFFFF0FF        :REM*232
303 DATA FFF0C00030C00030C000 3
    0C00030C00030C00030 C00030C
    00030C00030C0        :REM*108
304 DATA 0030C00030C00030C000 3
    0C00030C00030C00030 FFFFF0F
    FFFF000000000        :REM*8
305 DATA 00000000000001FFC003 F
    FE00001F00000F803FE 780FFF7
    81FFF781FFEF8        :REM*34
306 DATA 1FE7F81FE7F81FFFF81F 7
    FF01EFFE01EFF801E00 000F000
    007FFC003FF80        :REM*37
307 DATA 000000FF000000000000 0
    0000000400000E00004 4200044
    20004E2000E47        :REM*227
308 DATA 0004420004E240044280 3
    247003FFF001EAE000F FE0007F
    C000000000000        :REM*67
309 DATA 0000000000000000100F 1
    0070C04130312010314 0916050
    004011 9FF0D0F       :REM*186
310 DATA 0E1408FF190501120053 0
    453D8330633DA00110B 17181A1
    B1C1D1E271E1F        :REM*232
311 DATA 22232425262 8292A2B2C 2
    D2F3B3C3E213D202E07 000D000
    A000701 00FF0B       :REM*8
312 DATA E0000306090C0F121518 1
    B1E210A010E0605020D 0112011
    0120D0119 0A15       :REM*153
313 DATA 0E0A150C0115071305 10 0
    F03140E0F1604050339 05D9C90
    6DA0001000201        :REM*37
314 DATA 03323C05231 9644B9600 0
    12829000127010004E0 053FFFF
    FFFFFFFFFFFFF        :REM*167
315 DATA 40000143EF5F7FFF0041 0
    0E0F8FEFFFFFF004200 070F1F7
    FBFDE004302C7        :REM*141
316 DATA E2F2FFFFF00044001C3E F
    FFFFF1F0045060F1FBE 7DFBC00
    046003078FCFE        :REM*209
317 DATA FF7F00471E0C0C0C0C6C 7
    F00483E66603C46667C 0049F06
    0606060637F00        :REM*123
318 DATA 4A3C7E66667E6666004B 6
    6767E7E6E666004CFC 6666666
    666FC004D1038        :REM*164
319 DATA 38101000100 04E003063 4
    6466330004F000CC602 02C60C0
    0507C66667C66        :REM*251
320 DATA 66660051666666666666 7
    E00526666767E6E6662 0053003
    E00FC003E0000        :REM*154
321 DATA 70717273205052455345 4
    E545300606062636465 6600676
    8696A6B6C6D00        :REM*82
322 DATA 6E6F2052554E204D4147 4
    15A494E452031393838 0057524
    95454454E2042        :REM*221
323 DATA 59204A4F484E20562E20 5
    259414E005052455353 20414E5
    9204B45590047        :REM*65
324 DATA 414D45204F5645522020 2
    0000028320000        :REM*55
325 DATA -1                 :REM*183
```

■



RUN Amok

Item: Commodore Lanes (March 1988, p. 88) contained two errors, neither of which would affect the running of the program. Line 60's checksum, which is 63, was inadvertently omitted, and the checksum for line 280 should be 211, not 101.

Item: In Table 2 of Get Your Club Online (April 1988, p. 44), some of the information for C-NET was incorrect. It should have read: Prospective Software, PO Box 87175, Canton, MI 48187; phone 313-981-4113, and the prices for the 64 and 128 versions should read $64.95 and $89.95, respectively.

Item: Also in the April 1988 issue, there were two errors in the Table of Contents, both due to last-minute layout changes. News and New Products wound up on p. 20, not 22, and (of all things!) RUN Amok and Commodore Clinic were placed out of sequence in the TOC, although the page numbers were correct.

Item: Oops! Our amok really runneth over in Form Writer (June 1988, p. 46). The listing is 100 percent correct if you're using a C-128; however, C-64 users must not type in the statements in lines 10, 340 or 1880, but, to play safe, should type in REM for each of these lines. Furthermore, the documentation was regrettably not adjusted to take account of last-minute program changes, so there are several incorrect line references. In the last paragraph on p. 47 and the fourth paragraph of the middle column on p. 50, line 6 should read line 60, and, in the same paragraph on p. 50, lines 2820–2830 should read lines 1530–1630. Finally, in the last paragraph of the article, lines 64–67 should be lines 420–450.

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With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times R

Listing 1. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=4
   9152
30 FOR I=0TO169:READB:CK=CK+B:POKE SA+I,B:NEXT
40 IFCK<>20651 THENPRINT"DATA ERROR!":END
50 POKESA+110,240:POKESA+111,38:POKESA+140,234
60 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
70 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
   THEN 100
80 POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
   KESA+26,165
90 POKESA+39,20:POKESA+41,21:POKESA+123,205:POK
   ESA+124,189
100 POKESA+4,INT(SA/256):SYS SA:NEW
110 DATA 120,162,24,160,13,173,4,3,201,24,208,4
    ,162,13,160,67,142,4,3,140
120 DATA 5,3,88,96,32,13,67,152,72,169,0,141,0,
    255,133,176,133,180,166,22
130 DATA 164,23,134,167,132,168,170,189,0,2,240
    ,58,201,48,144,7,201,58,176
140 DATA 3,232,208,240,189,0,2,240,42,201,32,20
    8,4,164,180,240,31,201,34
150 DATA 208,6,165,180,73,1,133,180,230,176,164
    ,176,165,167,24,125,0,2,133
160 DATA 167,165,168,105,0,133,168,136,208,239,
    232,208,209,169,42,32,210
170 DATA 255,165,167,69,168,170,169,0,32,50,142
    ,169,32,32,210,255,32,210
180 DATA 255,169,13,32,210,255,104,168,96,104,1
    70,24,32,240,255,104,168
190 DATA 96,56,32,240,255,138,72,152,72,24,162,
    0,160,0,32,240,255,169
200 DATA 42,208,198
```

■

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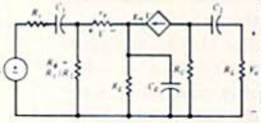

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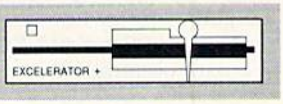

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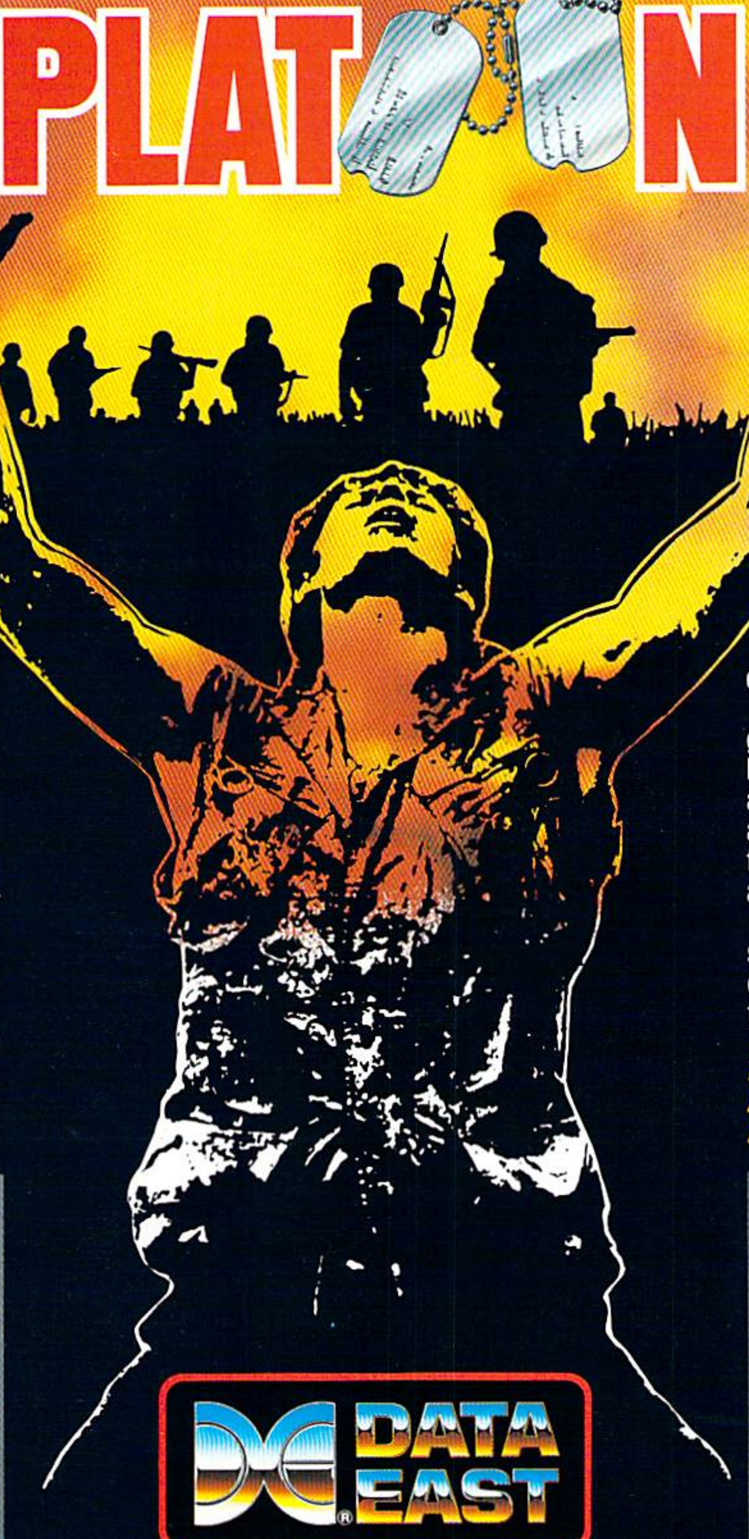

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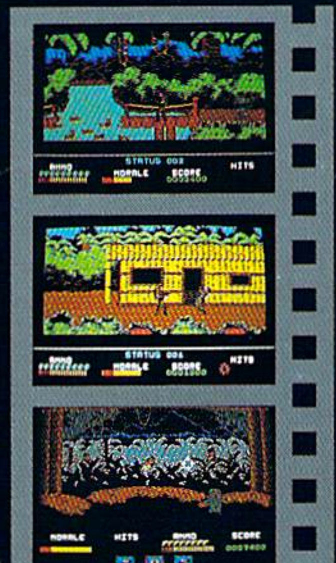

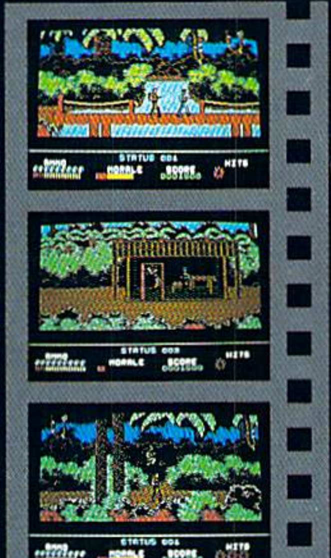

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